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LIEUTENANT-GENERAL C. P. BEAUCHAMP WALKER, C.B., &c., &c.,
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ARMY TRANSPORT: THE ORGANIZATION AND TACTICS
OF MILITARY CONVOYS IN WAR.

By Major WILKINSON J. SHAW, M.A., 102nd Fusiliers; Garrison
Instructor, Aldershot.

THE subject which I am about to bring forward for your consideration is directly connected with one of the burning military questions of the day. So evident and earnest indeed is now the disposition to grapple with the difficulties which have hitherto deterred us from any serious effort to solve the problem of how to provide and work an efficient transport establishment in time of war, that I feel assured that I need offer no apology for introducing to your notice a question so closely bearing upon it, as that of the formation and management of convoys, during active operations in the field.

As a preliminary consideration, I would ask you to bear in mind, that whatever the character of an army transport may be in time of peace, it must necessarily from motives of economy consist of only a nucleus force, the value of which will depend not alone upon inherent merits of constitution and organization, but upon capacity for immediate expansion to any necessary extent on the sudden outbreak of war. Thus, however numerically weak the *cadre* of the transport may be, not only should the *matériel*, such as wagons, carts, draught and pack animals, be the very best of their kind, and the *personnel* be thoroughly trained to the performance of its duties, but the entire system should be so well organized, and so clearly defined by a simple code of regulations, accessible to the whole Army, as to place it in the power of all regimental Officers to acquire the requisite knowledge and training for the performance of transport duties. The augmentation of the *matériel* of transport with a view to hostilities, is a mere matter of arrangement and expenditure, but the corresponding increase in the *personnel* to direct and work the train can only be effected by drawing upon the staff and regimental establishments, until at all events such time as we shall have a sufficient reserve of

Officers and men for all possible duties; a solution for future times of one of our present difficulties. Unless the Officers so posted to the Transport Corps can perform their duties efficiently at once, they would rather be an incumbrance than a benefit to the Service. Similarly, as regards the escorting of supplies in the presence of an enemy, the duties connected with which are so closely allied to those of transport; these cannot be learnt by inspiration, nor taught without rules to guide the instructor.

Up to the present time we have always, with a certain happy-go-lucky confidence, waited for the actual outbreak of hostilities, before we organized our war transport; and the results have in each case been, as might be expected, inextricable confusion, an extravagant outlay, and an inefficient establishment. What is indispensable to meet the true requirements of the case, is a carefully considered system based upon recognized principles, and promulgated by means of such detailed regulations as may be necessary for the proper comprehension of duties by all concerned. Some efforts in the right direction have recently been made, but as yet, the immediate subject of my lecture has not received official attention.

I would therefore propose that we briefly consider, with a view of bringing the subject to notice, what might be the general rules to guide military convoys in time of war, both as regards their organization and their tactics; not with any intention of arbitrarily dictating what must and should be done under every circumstance, but rather what might and could be done with best advantage under varying conditions of action.

Convoys during military operations have for their object the transporting under escort all *matériel* required in war, such as ammunition, treasure, provisions, baggage, and equipment, as well as wounded men, sick, and prisoners of war. Railways in the present day, so far as the more civilized countries are concerned, supply much of the transport necessary for an army in the field, more especially as regards the second or interior line of transport, that from the base to the advanced magazine. But even in such localities, convoys by road and water are often required to supplement the railway transport, or to connect the various links. In less favoured lands, it is necessary to move all supplies by vehicle, pack animal, or boat, and sometimes by human labour.

So far as the second line of transport is concerned, its complete military organization is not of so much importance as that of the first line, which conveys supplies from the advanced magazine to the divisional head-quarters of the fighting portion of the troops; from this point or points the regimental transport, if sufficient for the purpose, takes on the supplies as required to the various corps at the extreme front. The second line will usually comprise most, if not all, of the auxiliary or country transport, when a trained departmental corps is available to move with the advanced troops. Railways, rivers, and canals, play their part principally in the second line, but occasionally, if not often, both rail and water transport may be used to connect two points in the advanced line.

In the second line, although full military organization may be wanting, the Officers and conductors should be military, and every effort ought to be made to introduce, so far as possible, into the working of this portion of the transport, a system in uniformity with that of the trained corps in the front.

In the first line, a strictly military organization and training is indispensable. We may take it for granted that this is now so clearly established to be necessary, that no General valuing his reputation would take command in any future campaign, against an enemy skilled in scientific warfare, on any other conditions.

The future organization of the Commissariat and Transport Corps is designed to be much more military than in the past; we may therefore anticipate that the time-honoured inevitable friction between the combatant and the civilian elements in the transport service will soon disappear, and with it many of the obstacles to its efficient working during military operations. I propose to return to this subject later on; but, for the moment, we will assume that the future Transport Officer of a convoy in the field will have had a purely military training, as well as a technical one in his special transport duties. In addition to the Transport Officers who are in immediate command of their own men, with full disciplinary powers over them, those portions of the transport which march with the troops, and convey their baggage and supplies, are usually placed under the orders of baggage-masters, one to each brigade or division, who exercise a general command over the whole of the trains and their guards, and regulate their order of march.

When transport does not accompany the troops, but is moving in independent bodies from one point to another, the convoys proper so formed are no longer under the direction of baggage-masters, but are detached under separate command. They have a sufficient escort to protect them, in case of attack, under the charge of an Officer, whose orders all marching with the convoy must obey. Convoys of this kind would generally be by road, the supplies being conveyed by wheeled vehicles or pack animals, sometimes by carriers; they might, however, be by water, and occasionally by rail. We will therefore consider each in turn, both as regards their orders of march and their means of defence against attack.

A Convoy by Road.

The senior Officer of the transport service attached to a convoy is immediately charged with its organization, *i.e.*, with everything connected with the men, horses, and vehicles composing the transport. He is responsible for the completeness of the equipment and for the loading being correctly effected, as well as for the animals being properly cared for, and the drivers kept under strict discipline. All arrangements, however, as regards orders of march of the carriages and *matériel*, must be made by the Transport Officer with due reference to the commander of the convoy, in order to ensure the proper disposal of the escort.

The commander of the convoy, on being named for the duty, should

consider, with the help of his map and of such information as he can obtain, the following points:—

- a.* The distance and route which the convoy has to travel.
- b.* The position and strength of the enemy, and the quarter from which attack is to be apprehended.
- c.* The nature of the country, roads, &c., to be passed over.
- d.* The number of carriages and beasts of burden forming the convoy, with the nature of their loads.
- e.* The number and description of the troops detached for escort duty.

The distance and route must be known, in order to arrange the various details of the march, especially as regards the places where halts are to be made. Whether the enemy is near at hand or at a distance, the advance of the convoy should be conducted with due regard to the possibility of attack, the precautions being redoubled when his close proximity renders attack probable.

The nature of the country should, if possible, be ascertained, in order to decide where the enemy would be likely to establish ambuscades or to attack in the open. The width and character of the roads are important considerations, as they will regulate, to a certain extent, the order and rate of march of the convoy. Lastly, lines presenting the most secure retreat from various points of possible attack must be duly ascertained, and from what quarters, in such case, assistance or reinforcements could be best procured.

It is evident that the composition and strength of the convoy, and its manner of formation on the line of march, must influence to a great extent the disposition to be made for its defence. The detailed plan of disposal of the various carriages or beasts of burden of the convoy, and the strength of its fractions, should therefore be arranged by the Transport Officer with the commander on the day or evening before the march.

The principles upon which the convoy should be organized for the march are exceedingly simple. The whole of the carriages, whether hired or military, should be told off into subdivisions of suitable strength, say about twenty-five carriages in each, under a Transport Officer. These may again be told off into sections of eight or twelve each, under conductors. The subdivision may be considered for the time as the tactical unit of the convoy.

When moving over a difficult country, the method of working by units will be found all-important, the passage of bad places being made under personal superintendence of the subdivision Officers, and strict control being thus enabled to be held at all times over the drivers while on the march. Should there be pack or led horses added to the convoy, it is usual to place them first as a distinct unit. If behind the carriages, they would suffer much, in dry weather from the dust raised by the column, and in wet weather from the roads being cut up by the wheels of the preceding vehicles.

Although the order of march of the carriages must necessarily be influenced by various considerations, and be arranged in subordination to the conditions of each particular case, especially when the projects or probable movements of the enemy are known, the general

principle to be maintained is, that those carriages whose safety is of most consequence to the Army should march in the position most likely to preserve them from danger. It is, however, generally advisable to send on the vehicles containing the baggage, cooking utensils, and rations of the troops of the escort and convoy, in the extreme front of the other wagons, so that they may reach the camping-ground first on the termination of each day's march. If the danger of attack is not imminent, these carriages, formed into a separate section under a conductor, may accompany the reserve of the advanced guard.

Having considered these points, the commander can make his final dispositions for the security of the convoy on the march, having regard to the strength and composition of the escort placed at his disposal. In issuing his orders he would probably find it desirable in a mixed force, to dispose the escort somewhat as follows:—

1st. Advanced scouting parties.

2nd. Advanced guard preceding the convoy.

3rd. Main body accompanying the convoy.

4th. Rear guard following the convoy.

The advanced scouts would be of cavalry, and the parties furnishing them need not be strong, as reconnaissance, not resistance, is their business. They would patrol to the front and to the flank or flanks, according to circumstances, extending in an open country to a distance of from three to five miles from the convoy. The advanced guard and rear guard would together amount to about a fourth of the strength of the whole escort, in the proportion of two-thirds of the former to one-third of the latter. The remainder of the escort may be thus divided:—

The front detachment	$\frac{1}{8}$	} Of the main body. ¹
The rear detachment	$\frac{1}{8}$	
The centre detachment	$\frac{1}{4}$	
The reserve	$\frac{1}{2}$	

The advanced guard should head the convoy well to the front, having its leading group at least 1,000 yards from the first carriage of the convoy. It would usually consist of infantry, and perhaps a couple of guns, with some cavalry to reconnoitre in front of the infantry advanced party. The cavalry should send patrols up all roads leading into that to be followed by the convoy, their scouts pushing on as far as possible without losing their touch. In an inclosed country these scouts will be the extreme feelers of the convoy, and much depends upon their intelligence and activity. In an open country the advanced cavalry scouting parties, sent out in the supposed direction of the enemy, form an outer screen, and will probably afford the earliest intimation of coming attack. A few pioneers or engineers carrying tools accompany the point of the

¹ This division of the escort has been advocated by many military writers, and will be familiar to the student. The principle upon which it is based, of keeping a large portion in hand as reserve and disposing the remainder in two or three formed bodies where most required, is sound. It would be a fatal mistake to distribute the escort equally along the whole length of the convoy.—W. J. S.

advanced guard, for the purpose of repairing bad places in roads, clearing a temporarily obstructed bridge, or other like duties. The rear guard should march close after the convoy, and be formed of infantry, with a small party of cavalry added.

The main body, which is principally composed of infantry, furnishes the necessary guards to the wagons from its reserve. When civilian or native drivers are employed, it is advisable to have a soldier to each vehicle; but should the escort not be strong enough for this, one soldier must look after several wagons.

In open country the reserve would generally march near the centre of the convoy on the most dangerous flank. Its duty is to move to any threatened portion of the convoy, so that the centre, front, or rear detachments need not leave their position for the purpose of aiding one another, thereby for the time allowing their own part of the convoy to be unprotected. When a defile, bridge, or ford is about to be passed, if the rear appears secure, the reserve, or a portion of it, should push on and march in front of the convoy, next after the advanced guard. If the rear is threatened, the reserve would fall back and follow the convoy in front of the rear guard. In a close country the reserve would march preferably with that portion of the convoy most exposed to the enemy's attacks; generally, in such case, either the head or the tail of the column.

If artillery forms part of the escort, it has been said that a small portion of it may be attached to the advanced guard. The remainder would, in general, march with the reserve of the main body, following the rules laid down for that portion of the force. Thus placed, the guns are always ready to come into action quickly, to neutralize the effect of hostile artillery upon the carriages of the convoy, or to act otherwise as required, and are yet secured from being cut off or captured by the protection afforded to them by the other arms of the reserve.

There may be occasions, especially if the escort be strong, when the reserve must not hesitate to attack the enemy, or even to advance to give him combat on some distant position, should such be well suited to cover the advance of the convoy, and to save it from the dire effects of long-range fire. In the event of success, there should, however, be no pursuit of the enemy, and the commander must, in any such encounter, remember that the fate of the reserve will probably decide that of the convoy under his charge.

These considerations apply to the case of a convoy marching through an ordinary country, but in a very close, rugged, or mountainous locality the cavalry scouting, upon which so much stress has been laid, must necessarily be restricted in its operations. Infantry has, in such cases, to flank the convoy as well as to head it, selected active scouts being pushed out as far across country as possible; cavalry patrols can only be used on the roads and on good mountain paths.

The length or depth of a road convoy, whether consisting of beasts of burden, or of wheeled vehicles, can always be calculated from known data, some of which are established for all countries and circumstances, but others of which vary with local conditions. Thus we know that a four-wheeled Government wagon, with four horses or

mules, two abreast, requires 12 yards of road, and that a cart, with two horses or mules abreast, takes 6 yards of road, an intervening distance between every two vehicles of 4 yards being always allowed. Hence, for each wagon we want 16 yards, and for each cart 10 yards. Should both kinds of vehicles be mixed in equal proportions, we can get the total correct depth of the convoy by allowing 13 yards per carriage. Thus, in a convoy of 50 four-horsed wagons and 50 carts, the depth of the column, without allowing for straggling, would be 1,300 yards; as $(50 \times 16) + (50 \times 10) = 1,300$. For pack animals 4 yards may be allowed for each horse or mule, and 5 yards for each camel, in file. It is hardly necessary to add that a liberal percentage for opening out on the march must be included in every calculation.

Local variations in the data, and additions thereto, are of course often necessary. In New Zealand, the country two-wheeled cart was drawn by two horses tandem fashion; here 14 yards had necessarily to be allowed instead of 10 yards for each two-horsed cart in column of route. In Zululand, the ordinary ox wagon, with its span of 16 oxen, took about 28 yards of road, so that, with ordinary distances added between each two vehicles, a depth of at least 32 yards had to be estimated for every wagon in file. As a matter of fact, a little more was required, it being considered good driving when three wagons did not occupy more than 100 yards of road.

Special calculations must always be made for coolies, as the mode of carrying burdens varies in different countries.

Whenever the width of the road will admit it, the files of a wheeled convoy should be doubled, and it should march two carriages abreast. This should not, however, be done unless the roadway is sufficiently broad to allow of three carriages passing abreast of each other, with an interval between every two carriages.

Similarly, in the case of pack animals, they should march two abreast when circumstances will allow of it, but a pack animal when loaded requires quite as much, if not more, lateral space than a wagon or cart. An interval of frontage must be allowed, also, between pack animals when moving abreast on a road.

The fact of the length of the column being thus reduced is a tactical consideration of much import to the commander when in immediate vicinity of the enemy; but the double order should not be resorted to on the ordinary march, unless it can be maintained for at least an hour without again reducing the frontage. In England, the hedged-in country roads would hardly admit, with some few exceptions, of a double file of wagons or carts on the march, without impeding the traffic, but on the Continent of Europe many *chaussées* will be found where the formation might be easily adopted. In Zululand, the open country, and it may also be said the general absence of roads which could be dignified with more than the name of tracks, suggested the expedient of moving with more than two columns of wagons abreast, a mode of effectually reducing the depth of a convoy, which was constantly adopted during the campaign.

The pace of a convoy, including short halts, will rarely exceed two miles per hour, under fairly ordinary conditions. If the roads are

heavy and the country hilly, no estimate whatever can be given of the progress. Under such circumstances hours may be consumed in advancing a single mile.

In very rough country, where the roads cut out of the sides of hills are badly constructed, it not unfrequently happens that a pack-horse or mule, or even a team and wagon, rolls over the outer edge, in spite of all precautions to prevent such a catastrophe. If the animals are not injured by the fall, they had best be hauled up the bank by a rope fastened round their necks, should the ground be too steep or slippery for them to obtain a footing.¹

It is of the most vital importance on convoy duty that personal supervision, of the strictest character, be given by Transport Officers and conductors on all occasions of watering their animals. It is not always sufficient to take a horse to the water, for should he decline to drink, the proverbial difficulty of how to make him do so must be solved, or else he will probably knock up during the ensuing march. Both horses and mules are often exceedingly capricious in their choice of water, and annoyingly suspicious of it when offered to them, even though they may be hot, tired, and dusty. An ignorant or careless driver will as likely as not, under these circumstances, remove his horses from the watering-place before they have even done more than wet their muzzles;² next day he will wonder why his team cannot work.

The halts to be made by a road convoy are of two kinds—short halts and long halts. The former should take place every hour or half hour, according to requirements. They are made in open ground and, if possible, near water. The long halts are for the purpose of resting, and of providing refreshment for men and horses. They should only be made in positions well explored in advance by the cavalry, and also by the advanced guard. If the enemy is near, the convoy should be formed into a park in some convenient form, such as a square, rectangle, or oval, the hind wheels of the carriages turned outwards, and the horses facing inwards. Should the convoy be very large, each three

¹ This is by no means as barbarous a method as it may seem to the casual reader, the horse and mule being provided by nature with very powerful elastic ligaments, which extend from the head to the withers along the top of the vertebrae of the neck, and are capable, as are also the strong muscles of the neck, of sustaining an enormous pressure. The rope, moreover, acts to a certain extent against the angle of the lower jaw, which is of great strength. A blanket should, however, be so adjusted under the rope as to prevent too much direct pressure upon the larynx or wind-pipe. The author on one occasion, while in charge of a road convoy during the New Zealand War, recovered safely, in this fashion, a team of horses which had fallen down a steep bank, between 20 and 30 feet deep, into a wet ravine. A pair of leaders on the road were hooked on to the upper end of the rope and drew each horse, placed on its side, safely up the bank, without any difficulty.

² A handful of freshly-plucked grass, put into a bucket of water, often tempts a horse to begin to drink. Some years ago, when travelling post in the island of Java, the author saw this method practised by the native ostlers at the post-houses. Every horse, on being taken out of the carriage, was provided with a tub of water and grass. Those careless about drinking began by munching the grass, but sooner or later, generally in a few minutes, they took their fill from the bucket. Mules are sometimes even more fastidious about the water offered to them than horses.

or four subdivisions might form a distinct park as they arrive at the halting place. A village, the outlets of which can be strongly occupied by the infantry, and which is not commanded by high ground within range, is often a good position for a halt, as the houses will protect the teams, which may, therefore, be unhooked from the wagons with greater safety. For a night halt, such a place would in some respects be very suitable, especially if there should be a large open green or market-place surrounded by houses in which the whole convoy could be parked in one square or oval; but if the country were hostile and the people unfriendly, it would be dangerous. In the latter case a night halt had better be made in open ground, and away from habitations. During day halts, half the men of the escort only at a time should pile arms and take their food, the other half remaining on the alert under arms. During night halts the usual outpost arrangements must be made for security, whether the convoy is encamped in a village or on open ground.

Should the alarm be given when on the march, of cavalry being about to attack, the double formation may be assumed if the width of the road permits. Then, on the enemy approaching, the leading carriages of a wheeled convoy draw across the road, horses inwards, and halt, each pair of carriages as they close up to the front doing likewise. This method of receiving cavalry attack will not only serve to protect the horses, but also, by shortening the depth of the convoy to about one-sixth of its normal length, enable it to be much better covered by the escort. If the route is narrow, the wagons can only close up to the front on the leading vehicle, the horses of each team being turned across the road, away from the most dangerous flank, on coming to the halt.

Similar dispositions should be made in the case of pack animals, so as to reduce the depth of the convoy as much as possible.

When longer notice of attack is given, and should the attacking force be strong, the convoy may, if thought necessary, be parked for defence on some suitable ground in the manner already described. When the convoy is parked in a hollow square or oval, it is not generally a good plan to dispose the fighting line of infantry behind the wagons, unless the attack has been precipitated before preparations are completed. If posted thus, the infantry are certainly in some measure protected in the case of a sudden rush being made upon them by overwhelming numbers, such as may sometimes occur in irregular warfare; on the other hand, under ordinary conditions they can act more freely and be under more direct command, by being placed in front of the line of wagons, protected by any natural or rapidly-made artificial cover available. Were they behind the carriages, moreover, the plunging amongst the horses inside the park, caused by the attack on the convoy, would tend to distract the attention of the men of the fighting line from their Officers' words of command. That portion of the escort, however, reserved as a support to the front line might sometimes be kept behind the wagons with advantage, unless accidents of ground afford also for it an equally secure and better position outside the park.

The guns should be placed on one flank of the park, not too far

from it, in the best available position for opening long-range fire upon the enemy, so as to delay his advance and give more time for preparation, and whence they may also be able to silence the enemy's guns, should they be brought to bear upon the park at effective range. The guns must be protected by some temporary shelter, if time permits, and by a portion of the escort posted on their outer flank.

When the enemy has been repulsed and driven off, the cavalry may follow him up for a short distance, to ensure his not returning while the convoy is again resuming its order of march.

In considering the general possibilities of an attack upon the convoy, and the means of defence which he should employ, the commander must not disguise from himself that there are many advantages on the side of the attacking party in such a contest. The assailants will usually have been able to reconnoitre the country through which the convoy has to pass, if not already acquainted with it, and by means of spies will have doubtless become aware of the strength and composition of the escort and convoy, being possibly able to base their dispositions, unless special secrecy has been observed, on further knowledge of the intended hours of starting and exact destination of the convoy, on each day of the march. They can thus, in fact, choose the place, time, and moment of attack on any selected portion of a long and often unavoidably straggling column.

The composition of the force by which the convoy is assailed becomes an important consideration in the defence. Thus if the raiding force consists of cavalry alone, the commander of a mixed escort need not apprehend defeat, for by proper tactical disposition of his infantry, he can usually ensure the safety of the convoy against such enterprise. But if guns form part of the assailing force, the commander of the convoy must silence them promptly with his own artillery, if he has any, or else bring them as quickly as possible under the rifle-fire of groups of marksmen, pushed forward to an advanced position; for guns, if brought to bear at effective range upon the carriages of the convoy, would easily destroy the order of march, block up the road with disabled horses and vehicles, and as a general result, render further progress impossible.

Careful reconnaissance on the part of the advanced scouts has at all times been recognized as affording the best means of protection to a convoy, by the notice thereby obtained of the enemy's approach, and consequent opportunity of preparing to receive his attack. In these days of arms of precision, the point from which the enemy can commence his attack being more distant, this reconnaissance must necessarily be of an extended character. The cavalry patrols in the outer circle should, therefore, wherever possible, be pushed to a considerable distance in the direction from which the enemy's advance is probable, while in the inner circle of defence it will still, as formerly, reflect but little credit on the infantry advanced guard and its flanking patrols, should an attack be made upon the convoy in the nature of a surprise.

Here is a small model of ground (see Plate IX), upon which I have disposed a convoy of 100 wagons or carts, with a view to illustrating one of the methods which might be pursued on an occasion of threat-

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FIG. I.
Convoy of 100 wagons on the march escorted by 3 companies, 1 troop, & 2 guns, advanced scouting party sends back notice of approach of the enemy's cavalry from the north-west.

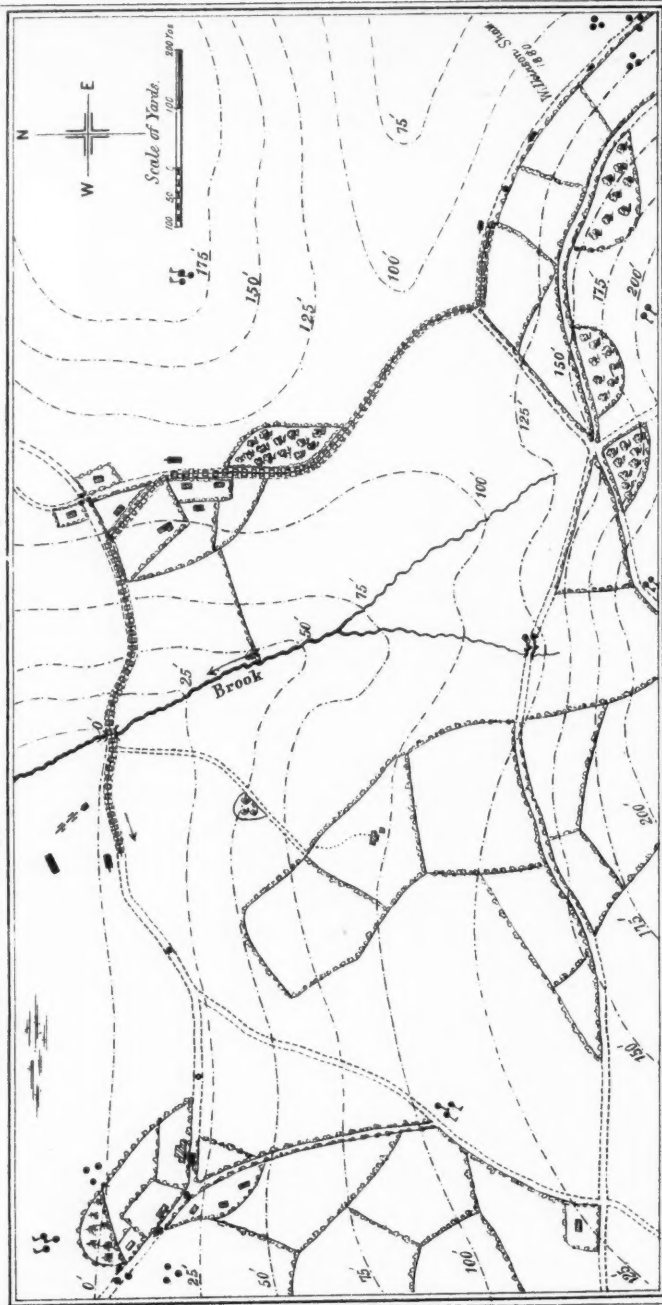
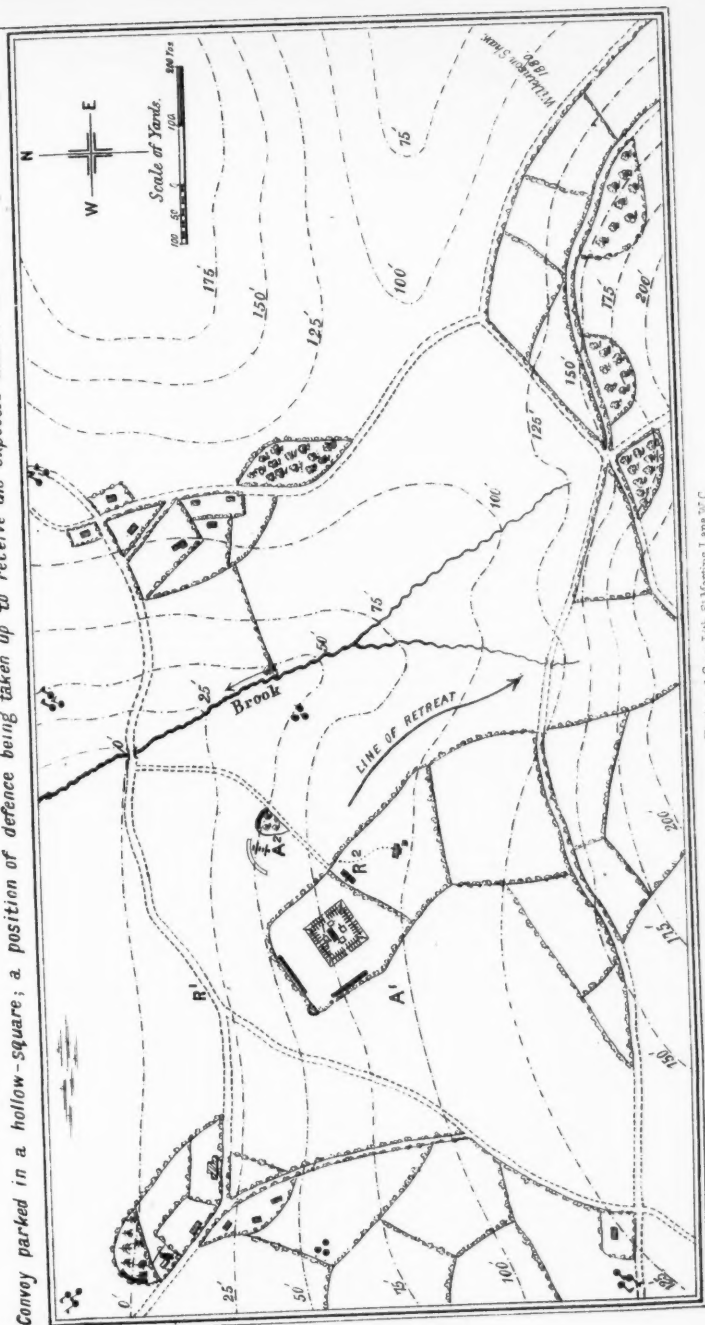


FIG. 2.
Convey parked in a hollow-square; a position of defence being taken up to receive the expected attack of the enemy's cavalry.



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ened attack by a strong force of cavalry. The model is on the scale of 25 yards to an inch, and the extent of ground represented is about a mile and a quarter in length by three-quarters of a mile in width. The example I propose to show you is in two stages.

First Stage. Fig. 1.

The head of the convoy, which has an escort of three companies of infantry (100 men each), and one troop of cavalry (48 men), with two field guns, has just crossed the bridge, the direction of its march being westerly, when it is brought to a halt by news of the enemy's vicinity. The rear vehicles, which have been straggling, close up to correct distances, so that the convoy extends over about 1,500 yards of road. The infantry of the advanced guard (half a company) is on ahead of the convoy, and has just passed a cluster of houses where the main road bends towards the north-west; its cavalry (half a troop) has trotted on in advance, and with exception of two flanking patrols is not shown. The rear guard (a section of infantry and a few mounted men), is close behind the convoy. The main body of the escort furnishes a front and rear detachment of a section each, with a centre detachment of a half company, leaving a section for wagon guards and a company in reserve. The latter, accompanied by the guns, is covering the passage of the convoy over the bridge under the immediate supervision of the commander. The remaining half troop of cavalry is out scouting five miles in advance, and from this party the information is received that a strong force of the enemy's cavalry is advancing from the north-west. The commander of the convoy determines to park his wagons, and to take up a defensive position in connection therewith to resist the enemy's attack. He calculates that he has half an hour clear in which to make his preparations.

Second Stage. Fig. 2.

The wagons are parked in a hollow square, in a field on the crest of a gentle slope south of the main road, about 500 yards from the bridge. The front side of the square faces north-west. The infantry of the advanced guard takes post at the far edge of the fir wood which commands approach by the main road; the half troop has galloped on to the extreme front. The guns trot up the hill and unlimber on the left flank of the field (A¹); the front detachment of infantry follows them and posts itself temporarily on their left rear. The reserve moves to the north edge of the main road (R¹). These positions are taken up to cover the formation of the park. The first subdivision of wagons moves off the road direct to the field, the ground being hard and sound, and forms the front face of the park; the remaining subdivisions turn up the road branching left after crossing the bridge, and form respectively the left, right, and rear faces of the square; the carriages are placed side by side facing inwards, an entrance being left in each face protected by a wagon made to act as a traverse. The last wagon arrives at the park in 25 minutes, having had about a mile to travel since the movement commenced. During the operation of parking, some temporary cover for the guns is thrown up by a working party on the right flank next to a small wood, the outer edge of which is strongly held by the rear detachment of infantry. When the park is formed the guns limber up and trot round to this second and more secure position (A²), whence they can equally well command all the approaches from the north-west, and also, if necessary, the bridge on the north-east. The front detachment falls back on the left bank and fence of the field, and extends behind it, sending a group of men under a corporal to occupy a clump of trees outside the western angle of the enclosure. The centre detachment retains a section in support behind the first subdivision of wagons, and lines the front bank of the field with the other section, its left resting on the clump. The reserve moves up to a position behind the rear fence of the field (R²). The teams are unhooked and ranged in order inside the square, the drivers standing at their horses' heads.¹

¹ The lecturer briefly explained the exercise, and moved the pieces on the model for the 2nd stage.

A Convoy by Water.

When an Officer is named for the command of a convoy about to proceed by water, he should hasten to acquire all the information possible regarding the nature and course of the river or canal to be traversed, in order that he may make his dispositions in accordance therewith. These will also to a certain extent depend upon the means to be employed for moving the boats of the convoy, and the consequent pace at which they will be able to proceed. The cavalry and guns appointed for escort duty in a mixed force will always move along the bank, but the infantry will only march when the convoy is unable to advance at a greater pace than two and a half to three miles an hour; this rate of progression represents what will probably be attained when the boats are propelled by oars, or towed by horses from the bank, or in some cases even when steam tugs are used if working against a strong current. When on the other hand the boats are able to advance at an increased speed, the whole of the infantry will usually be conveyed on board the vessels, in order not to delay the progress of the convoy.

When the rate of advance of the convoy does not exceed the marching powers of infantry, the general arrangement of the escort may be much the same as for a convoy by road, and the principles of action already suggested will in most particulars be applicable to the case of a convoy by water. The nature of the water-way will, however, influence the detailed disposition of the escort. Thus if it is wide and the enemy known to be on one bank only, the escort may all march on that flank of the convoy, with the exception of a cavalry patrol on the further bank. On the other hand, if the river is narrow and the position of the enemy doubtful, both banks and flanks must be occupied, and watched by the escort during the march. In either case some empty boats should accompany every strong convoy, placed at intervals in the column, for the purpose of conveying infantry from one bank to the other as may be required.

When the rate of progression exceeds three miles an hour, or the extreme pace which can be sustained by an infantry escort on the banks, the portion of the escort on shore will consist of cavalry only. An advanced and rear guard (the latter very small) would be formed of cavalry, with perhaps some horse artillery guns accompanying the advanced guard. A strong flanking patrol would march opposite the convoy. These troops would be on the bank nearest to the enemy with a small cavalry patrol scouting on the far bank. When the point of attack is doubtful, the cavalry must be equally divided, part on one bank, part on the other, should the ground be suitable for its movement. The leading boat of the convoy will carry the front detachment of infantry; similarly, the last boat will carry the rear detachment. The centre detachment will be broken up to furnish a small group of men as a guard for each loaded boat of the convoy, the remainder, if any men are left after the distribution of guards, being posted on board the centre boat. The reserve, consisting of one-half the infantry force, will be placed in special boats in advance of the centre of the column.

No stores will be conveyed in the boats carrying the front and rear detachments and the reserve.

Whenever during its progress through a varied country, the convoy approaches a defile, or close ground on either bank where the cavalry may find reconnaissance a difficult process, and the passage through which would be especially dangerous if held by the enemy, the front detachment may be landed, and the speed of the convoy checked in order to allow of the suspicious locality being searched by the infantry before the convoy proceeds further.

At night the convoy would be anchored, either in mid-stream, or on the furthest side from the enemy, according to circumstances, an outpost being always established on shore. Similar modified precautions will be also taken during the day, when the convoy halts for the purpose of giving rest and refreshment to the men and horses.

In the event of the escort on landing to meet an attack being driven back by the enemy, the infantry must try their best to get off again to the boats; the convoy would then proceed as fast as possible down stream, or on their course, should the conditions render it feasible, the cavalry of the escort moving in a similar direction along the bank. Before as a final necessity abandoning the boats of the convoy they should invariably be scuttled.

A Convoy by Rail.

The organization of a railway convoy in war time is somewhat similar to that of an ordinary goods train in time of peace. The stores are packed on trucks. A few third class carriages should be added for the escort, part in front, part in rear, and the remainder in the centre of the train. The train should have one powerful engine in front and another behind. It had better be preceded by a pilot engine drawing a carriage or truck for the purpose of conveying the advanced guard of the infantry escort, and of pioneering the convoy along the line.

The escort should not be nearly so strong as for a road or water convoy, both because it would entail too much loss of space to convey many men in the train, and because it would be impossible in case of an attack to bring a large force of men, stowed away in carriages and trucks, quickly enough into action to be of any service.

The escort should, therefore, be only of a moderate strength, proportioned to the size and importance of the convoy, and it would usually consist of infantry alone, all of whom would be conveyed by rail. Cavalry would, however, be sometimes employed in open country to scout on the flanks of the railway, when the length of journey to be made by the convoy does not exceed the distance which mounted troops could pass over in a two days' march. A portion of the force would start a full day in advance, and the remainder at successive intervals, so that the whole ground could be explored before the train passes through it. In more ordinary cases a convoy by rail depends entirely upon the protection it can carry for itself.

The commander of the convoy would probably take up his position in the guard's van, immediately in rear of the tender to the front engine, from which place he could best control the movements of the

train, with assistance of the guard or conductor. A couple of good reconnoitrers, keen-sighted men, should be placed on the engine for the purpose of assisting the engine-driver to look out for signals from the pilot train, or from the cavalry, if there are any, on the flanks, and to give the earliest warning of the enemy appearing in sight. The main body of the escort would be divided into a front and rear detachment of equal strength, and a reserve of one-half the whole.

The pilot train containing the advanced guard should keep from half a mile to a mile, according as the country is close or open, in front of the convoy. It may be a good arrangement to add a second truck to the pilot train, containing a party of workmen and some rails, in order to be able to remedy the most ordinary form of interruption to the traffic which would be attempted by an enemy. A few simple signals for the steam-whistle can be arranged between the pilot train and the convoy. On coming to any suspicious place the advanced guard should dismount to examine it. A careful look-out must be kept from the engine of this train for any obstruction on the line, or appearance of tampering with the rails or sleepers, early notice of which should be signalled back to the convoy.

In contemplating the possibility of attack, the commander must bear in mind that the enemy has the power of peremptorily obstructing the progress of the convoy at any point of the line, if only that point can be reached by the raiders. The impediment offered to the advance may either be temporary, as when an obstacle is placed upon the rails, or of a more serious character, as when some of the rails are removed or destroyed. When the convoy is preceded by a pilot train the commander will be certain to receive timely notice of attack should the enemy break up the line, for the advanced guard when stopped will transmit signal of danger to the rear. Should, however, a sudden attack be made upon the convoy by ambushed troops, whose presence the advanced guard has failed to discover, it may generally be assumed that as the rails have just been traversed by the pilot train they are so far safe, and that the convoy train need not necessarily be stopped by the enemy's fire. On the contrary, if there is no apparent obstruction on the rails at the moment of attack, the order might be given to put on full steam and dash through the assailants, who probably are endeavouring to head the convoy in addition to bringing a flanking fire to bear upon it. If, however, any temporary obstacle has been placed upon the line, or, as may happen, the rails have been displaced by a gun-cotton explosion, after the passage of the pilot train over them, the engines of the convoy train must be at once reversed and the carriages run back some distance, in order to deprive the assailants of the advantage derived from their selected position. On the train coming to a stand the escort should dismount on the opposite side from the enemy, and form up under cover of the carriages for offensive or defensive action as may be thought best. If the enemy is defeated, the obstruction can be removed from the line and the convoy thus enabled to proceed. If, on the contrary, the escort is worsted in the encounter it must fall back fighting upon the train, which should move slowly along the line till all have gained the carriages, and then

retreat at full speed. The advanced guard would be cut off, but it might perhaps escape in the opposite direction.

Although the escort of a convoy by rail would not, as a rule, include artillery, there is no reason why in a flat open country the train should not possess the advantage to be derived from the addition of one or two field guns carried on trucks. Guns were fired from trains both at Paris and Metz by the French. The batteries so used were sent forward on the railway lines which were then standing, for offensive purposes, and were composed of an engine and one or more blinded wagons, each carrying a gun, mounted to fire in all directions. The wagons appear to have stood the firing of the guns. There would, therefore, be no difficulty in preparing similar batteries to accompany convoy trains, under circumstances which would render the addition of artillery to the escort of especial value.

We must now return to the general question in order to establish the inseparable connection between the tactics of convoys and the interior economy of the transport service; and in treating of this part of the subject I will not venture to offer any opinions, but such as I think you will agree with me are justified either by the lessons of recent experience, or supported by authorities which none of us can call into dispute.

Most of the great commanders of past ages, as well as the leading ones of our own time, have in some form or other recorded their opinions in language that cannot be mistaken in favour of the necessity of military transport in the field being composed of a thoroughly well-organized and disciplined body. The military student will find much information on this and other points connected with the subject in Major Furse's "Studies on Transport." More, he may extract from the Blue Books and other official sources, if he has time and patience sufficient to wade through these instructive, but dry and diffuse, records.

The Duke of Wellington and his great adversary in the game of war, Napoleon, were each strong advocates of the train being formed on an exclusively military principle. Sir Charles Napier, in Scinde, found it necessary to introduce a military organization for his transport men and animals, whereby he not only obtained increased safety for his stores, but additional powers of mobility for his army, whose movements had hitherto been hampered by an undisciplined baggage train. On the general question Sir Charles has recorded his opinion that "the baggage of an Army can never be properly moveable even in Europe or America, still less in India, unless formed into a corps perfectly organized."

Years later, Sir Hugh Rose, reporting on the men of the Indian transport, in a memorandum quoted by Major Furse, says: "The camel, elephant, and bullock drivers, in short the men of the 'train,' from being all undisciplined and unorganized, compromised the safety, credit, and discipline of the Army, by the commission of every description of disorder and outrage, for which in India they are proverbial. They render hostile to the troops the inhabitants

"of the country, by ill-using and plundering them, thereby endangering our communications, supplies, and means of information. They give the worst example to the soldiers." Again, as Lord Strathnairn, he records his conviction, founded on his varied practical experience, that "the idea of organizing a transport train, of which all the elements would not be under military discipline, is a fatal illusion."

Notwithstanding this weighty evidence, when the Abyssinian expedition was preparing in 1867, we find Sir R. Napier overruled by the Indian civil authorities in his wish to place the Transport Corps on a proper military footing, and thwarted to such an extent that he was eventually obliged to enter upon the campaign with what afterwards proved an entirely insufficient, although a frightfully costly, organization. The arrangements so made were not, however, effected without earnest remonstrance on the part of the Commander-in-Chief. On the 9th September, 1867, replying to a minute of the Governor of Bombay, Sir Robert Napier says:—"I cannot accept, without protest, a decision to throw such a body of men as the drivers of our transport animals will be, if we get them, on an expedition in a foreign country, without a very complete organization to secure order and discipline."

By this protest some slight concessions were obtained, but the final arrangements for the proper discipline and administration of the transport were miserably deficient at the commencement of the campaign. The events which followed proved how accurate were Sir Robert Napier's anticipations, and how faulty the ruling of the Indian authorities on this important point.

If, then, it is beyond all reasonable question of doubt that the Transport Corps ought to be organized on a military footing, it logically follows that the Officers of the corps must be military Officers, and not civilians.

In recent campaigns we have heard a great deal of the difficulties experienced in working the transport, through the agency of a semi-civil department like the Commissariat. There has always undoubtedly been much force in the arguments put forward as justifying the claim of the department responsible for supplies, to the control of the transport which conveys them. But the Commissariat Department, although claiming (and in most instances successfully) the control over the transport, has never been able to officer it altogether with its own agents. The employment of combatant Officers, to serve under the orders of a civil department, has thus become necessary. Mutual tact and a regard for the interests of the service have often gone a great way in reconciling differences, but we know, as a matter of fact, that soldiers do not like to take orders from civilians, and that combatant Officers have a deeply-rooted objection to serving under the commands of an Officer of a civil department. Any want of harmony in the Transport Corps of an army might be attended with grave consequences; it is, therefore, evident that there ought to be no just cause for any such to exist.

The new organization proposed for the Commissariat and Transport

Staff, if only it be carried out in its integrity, bids fair to ultimately eliminate all such elements of discord from our transport service. Some ambiguity exists in the Royal Warrant, but sufficient scope is given to enable us to anticipate that the appointments of the Commissariat and Transport Staff will be filled up from the combatant section of the Army, as quickly as can be done with due regard to the efficient working of the department, *ad interim*, and to the claims of individuals. When the Transport Corps is officered exclusively by a military staff, the friction, which so many Officers on either side have laboured loyally, but in vain, to remove, will no longer have existence or name. The Quartermaster-General's Department will then lose the only strong claim it ever had to the administration of the transport, which may be as military in its formation as can be desired, without the necessity of breaking the chain of responsibility involved in its connection with the department of supply.

It is, however, only fair to remark that the view which I have taken of our probable future will be looked upon, in many quarters, as that of an optimist, inasmuch as an apprehension prevails amongst some of our Army reformers that the new organization may fail to effect its purpose, owing to a want of decision in carrying it to its legitimate end. It is pointed out that the infusion of the military element into the department is yet a question of the future, and that, since the higher grades have so far been recruited entirely from the existing civil branches, many years must elapse before the Transport Staff can assume that military character which alone can enable it to exercise efficient authority in its functions, and to hold its own place in working with the other services.

Thus, were we before long, as may not be impossible, to find ourselves confronted with an enemy skilled in modern war, we should, on taking the field, either have to remove the transport altogether from the Commissariat and place it directly under military control, as has quite recently been done in one of our minor wars, or else (contrary to the good advice of an American statesman, that "you should never 'swop horses while crossing a ford'") once more begin, during all the confusion of warlike preparation, to reorganize afresh our transport service. This is the reverse side of the picture, and I prefer to take the view that no such possibility can occur, for after all the warnings we have had, and with the newly-awakened interest that is apparent on all sides in this important question, I cannot but believe that those who have the power will act with ordinary common sense in the matter, and that they will not wait to be aroused from inaction by the portentous sound of the first shot fired in anger on the Continent of Europe.

We will, therefore, in deprecation of gloomy anticipations, assume, with your permission, that the future organization of our Transport Corps will be exclusively military; and, in further consideration of the question in its immediate application to the subject of my lecture, we cannot fail to perceive, that, the nearer the status and the duties of the Transport Staff Officer approach to those of an Officer of the General Staff, the more completely will the new organization work in accord

with the rest of the Army. Now, by the working of the new Commissariat regulations, the Transport Staff Officer will labour under one disability which I, for one, should be glad to see removed. He is not, by virtue of his Army rank as a combatant Officer, to exercise any military command outside the Commissariat and Transport Staff, while serving in the department. In this respect he is, therefore, at a disadvantage when compared with an Officer of the General Staff. On convoy duty especially, it would be a decided advantage if the Transport Staff Officer was able to act in both capacities, viz., as a departmental Officer to control and direct the march of his convoy, and as a combatant Officer to take part in its defence, even so far as to assume his right to command all present, if he should be the senior in Army rank.

When Captain A., of the 150th Regiment, serving on the General Staff, say on that of the Quartermaster-General, goes out with a strong reconnoitring patrol to examine the enemy's position, he takes command or not of the party, according to whether he is or is not the senior present in Army rank. Thus, if the Officer in immediate command of the patrol, Captain B., say of the same regiment, is junior to the Staff Officer, the latter will act in a twofold capacity, first in that of a departmental Officer, in making his reconnaissance and preparing his report, and, secondly, in that of the senior combatant Officer, should the enemy attack while carrying out the operation. Now, suppose Captain A., at a later period of the campaign, appointed to the Transport Staff. He is in transport charge of a convoy and finds himself, consequently, under the command of the Officer of the escort, no other, in fact, than his junior brother Officer, Captain B., whom he had himself commanded during the reconnaissance and, probably, on many other occasions. Yet of the two Officers, Captain A. might be, and, other qualifications being equal, from his training in Staff duties in the field, probably would be, the best fitted of the two to take command, apart from his seniority. Such is not at all an impossible or even an improbable case, and it is evident that, if we desire to obtain the services of the best Officers of the Army for our future Transport Corps, we must not allow them to labour under any disadvantages in their new position. There appears to be no reason, except the very weak one "it has always been so," why this anomaly should any longer exist, when the whole of the Transport Staff is composed of combatant Officers specially trained for Staff duties, and of proved tactical as well as administrative abilities. If thought desirable, however, the power to act in virtue of their combatant as well as their departmental position need only be extended to Officers of the Transport Staff when engaged in executive duties in the field, and not to the supply portion of the Commissariat Staff, whose duties, even though performed by combatant Officers, will necessarily at all times be more of an administrative than of a military character.

Whatever may be the ultimate status of the Transport Officer, it must, I think, be conceded without any room for doubt that the present weight of military opinion is altogether in favour of an absolute com-

mand over the whole convoy being vested in the person of the senior combatant Officer in charge of the escort. This Officer is, therefore, styled the Commander of the Convoy, and although he should not unduly interfere in the arrangements made by the Transport Officers for the loading and conveyance of the stores and in the details of preserving discipline amongst the drivers and of managing the transport animals, he must keep a general supervision over the convoy under all circumstances. The commander must remember that the duty he has to perform is to conduct his convoy in good order and safety, with all possible speed, to its destination. Anything which interrupts the progress of the convoy becomes of tactical importance, and whether it be a difficulty caused by the badness of the roads or by the obstruction of the enemy, it must be overcome. On the other hand, having regard to his special mission, the commander should understand that, unless forced upon him, he should avoid collision with the enemy rather than court it, and that it will be far more creditable to him to escape fighting, and to bring in his convoy intact and with speed to its destination, than to successfully engage and defeat an enemy, at the cost of more or less delay, and with the probable loss of some of the supplies and horses entrusted to his care.

Before concluding this sketch of the responsibilities attached to convoy duty in the field, it may be interesting to note what information we possess up to the present time of the transport operations in the minor wars in which we have lately been engaged in two different quarters of the globe. Some papers have been kindly placed at my disposal by the Commissariat, and also by the Quartermaster-General's Department, at head-quarters, from which I am able to extract a few brief notes on these subjects.

In the Anglo-Afghan War of 1878-79, although the Officers employed in the transport were exclusively military, the control of the service was not apparently taken out of the hands of the Commissariat. Thus, we find the Governor-General in Council, at the close of the campaign, thanking that department for the energy shown by its Officers in overcoming the difficulties of supply and transport. During a portion of the campaign, the new regulations for placing the line of communications under an Inspector-General were brought into force, for the first time, with successful results.

The transport employed appears to have consisted of bullock-carts; with camels, ponies, and donkeys as pack animals. Part of these were purchased by Government and part were hired, while a great portion of the work near the base appears to have been done by contract. Some improvised water transport was also made use of at one period, 1,000 tons of stores having been sent from Jellalabad to Daka on rafts in ten days, a work which it is reported would, with the existing land transport, have taken as many weeks.

The transport was, as usual, during the whole campaign the great obstacle to progress and success. The mortality amongst the camels, in many cases arising from the want of skilled drivers to attend to them, is already a matter of history. As the war progressed, things worked more smoothly no doubt, and we find General Biddulph, in an

order to the 2nd Division, at Kandahar, on its being broken up, saying, "Latterly the Transport Officers have been able to profit by experience; they have been careful and energetic, and the management of transport on the march is now well understood and satisfactorily carried out."

Notwithstanding this improvement and the knowledge doubtless gained, when, a few months later, a second campaign, that of 1879-80, became an urgent necessity, we find that at the first commencement of operations it was immediately recognized that "the great difficulty would be transport." On this occasion the transport was no longer left in the hands of the Commissariat, but neither was it removed from its connection with supply. The entire control of the duties connected with supply and transport was placed temporarily in the hands of Sir M. Kennedy, R.E., K.C.S.I., with instructions to report to, and receive orders direct from, the Government of India. As in the former campaign, a large number of military Officers—Majors, Captains, and subalterns—were attached to the Transport Corps, under Directors of Transport, who were either Colonels or Lieutenant-Colonels in the Army, one for each column.

Taking the instructions issued for the Khyber line as a type, we here find that entire control was to rest with the General commanding the column through the Director of Transport, who would be at headquarters or at other convenient spot, and there receive from the Commissariat all cattle, carts, &c., required for regimental, brigade, and departmental purposes, and distribute them as required. The transport was divided into general, brigade, and regimental. The Director of Transport at head-quarters had a Staff Officer and other assistants. A general Transport Officer was in charge at Peshawur, with an assistant detached to the "advanced depôt." A brigade Transport Officer was in charge with each force in Peshawur, Khyber, advanced depôt, and the advanced force. An Officer was in charge of regimental transport in each regiment, and a non-commissioned officer in each battery. All these were in direct communication with the Director of Transport at head-quarters. The same kinds of transport were employed as in the first campaign, and matters were soon with all three columns put on a better footing than at the first start, although the advanced operations of the 1st Division were at one time greatly retarded by the deficiency of transport with the leading troops.

On the Kandahar line by the middle of last October, stores were being rapidly forwarded up to Sukkur, carts and bullocks having been furnished from Bombay, as well as pack animals, for this line. The bad roads west of Quetta on the more advanced portions of this line, together with the dryness of the air, were, however, reported to have caused the breakdown of a large number of carts, which there was no means of repairing. In November the contract system was again resorted to on the Quetta line, in order to free the transport train for work at the extreme front. During this campaign a large proportion of the troops engaged were in possession of regimental transport. I have been unable to obtain any reliable details connected with the escorting of convoys during the Afghan campaigns.

On turning to the Zulu War, we find an Inspector-General of the Line of Communications and Base established in strict accordance with the new regulations, and that, after some transition stages not to be very clearly traced out, the transport was placed under the Commissariat, to be worked by a mixed force of military and departmental Transport Officers. The animals employed were principally oxen, but horses and mules, the latter both pack and draught, were also worked on portions of the lines. Reading through the various reports which have been made, one cannot help being struck by the accumulation of difficulties which beset the transport from the first, and it is only fair to say that all concerned appear to have spared no efforts to overcome them. Captain Healy, late of the 16th Regiment, the Assistant Commissary-General in charge of the 1st Division, after relating various other troubles which beset him, tells us, "There was a great absence of efficient and capable Officers with the transport of the division, only one of those employed having any experience, but they did their best, although labouring under many disadvantages." One of their greatest difficulties was evidently a want of sufficient control over the colonial conductors and the native drivers; in other words, from unavoidable causes the transport was not under sufficient discipline. The reason is very easy to understand. Captain Healy says in another place: "With regard to organization, the fatal mistake has been committed of endeavouring to carry it out at the time when active operations were being carried on. To organize at such a time, when all energies and efforts are directed to the actual execution of orders and movements, is practically an impossibility." What soldier, with the interest of the Service at heart, can fail to feel the justice of this remark, or, I may add, to withhold sympathy from those placed, through no fault of their own, in a position of such difficulty?

As regards the convoy arrangements, those of General Crealock's Division may be taken as fairly typical. They were, for the most part, performed as follows:—A convoy of about 100 loaded wagons would be dispatched from the Lower Tugela to the Inyoni river, where it met a convoy of empty wagons from Fort Chelmsford. There the escorts exchanged convoys, and the wagons proceeded each on their destined route, the loaded ones to the front and the empty ones to the Tugela. The escorts were very large, generally consisting of 1,000 infantry, with two guns, and a small force of cavalry for scouting purposes. As an additional security, also, the country was continually scoured, on the dangerous flank of the line of communications with the Tugela, by Major Barrow's mounted corps.

One reason, no doubt, for the size of the escorts was the length of each convoy, which extended over a considerable depth; 100 ox wagons, with spans of 16 oxen, and necessary distances between wagons, would occupy 3,300 yards, or nearly two miles in single file—say quite two miles, if not more, when the inevitable opening out on the march is considered; 100 general service wagons, with four horses or mules, each would occupy 1,600 yards, or with allowance for straggling, say one mile. Thus, the ox train would take double the length of road-

way of the horse or mule train when moving in one column. But although this may account for the escorts being large, we must not forget, as regards other considerations, that the 100 ox wagons conveyed as much as 300 general service wagons would have done (to say nothing of the fact, that the oxen required no forage to be carried for them), so that the advantage was all in favour, so far, of the ox wagon as a means of transport.

Every endeavour appears to have been made to compensate for the want of experience of Transport Officers, by the issuing of instructions from the base for the "Management of Ox Transport." Additional recommendations were also drawn up in the 1st Division, and promulgated in a memorandum. In this the convoys were divided into—

A division = 50 wagons.

A subdivision = 25 wagons.

A section = 8 to 12 wagons.

Of these, the subdivision was evidently the tactical unit, for it was recommended that the horns of the oxen of the different subdivisions be painted one uniform colour, and that each subdivision should have a distinguishing mark on its wagons, and be furnished with a spare span of oxen. We also find it clearly assumed in these instructions, that supreme authority over the convoy rests with the commander of the escort; some excellent practical suggestions, moreover, for the guidance of the commander, both as regards the organization and tactics of the convoy, are contained in the memorandum, which is signed by Major Cardew, in charge of the Quartermaster-General's Department, 1st Division, late of the Aldershot Staff.

In view of the discussion which is to follow, I must not trespass further upon the time at our disposal. I will therefore conclude this sketch of the duties and responsibilities of Officers on convoy service, with a hope that you will pardon the imperfect manner in which I have treated the subject—one that ill bears the consideration necessary to bring it within the scope of a short lecture. Many Officers more capable than myself of introducing these questions to your notice might easily have been found, whose practical experience also of transport duties in the field exceeds, and is more recent than, mine. I have, hence, felt diffident in undertaking the task, and you must allow me to repeat that my intention has been rather to make suggestions than to lay down absolute rules. Were, however, a code of instructions drawn up, by which a large number of Officers could be taught transport duties during peace, I am convinced no little advantage would be reaped therefrom in time of war; and as practical exercises in such work, the organization, attack, and defence of actual convoys under various typical conditions—the supplies being carried sometimes by wheeled vehicles, sometimes by mules or pack-horses, or else along our canals, and occasionally on our railways—might well, in my opinion, be constituted a feature in our minor tactical drills, and introduced as episodes in our peace manœuvres.

The highest praise that can be bestowed upon an army is to say of

it, that it can go *anywhere* and do *anything*; but let it be remembered that, without transport, an army could go *nowhere* and could do *nothing*. It would be like a long and magnificent line of railway, complete in everything except the steam that provides the motive power for its trains. Failure of transport would again, as it has before, suffice to paralyze the genius of Generals, the devotion of Officers, and the courage of soldiers. But if once it is admitted (and I think there is no disagreement among us on this point) that an efficient army transport is an indispensable condition to the success of military operations in the field, it will not be denied that its organization, discipline, and tactics, are of equal importance with those of the fighting branches. We can never expect to maintain in peace any one of our various military establishments on a sufficiently broad basis to meet the requirements of war; but with a recognized principle of action for each branch of the service, with clearly defined codes of regulations, with the *matériel* as thoroughly organized as possible, and the *personnel* carefully trained to the performance of every duty that may devolve upon it, the expansion of the various *cadres* to any necessary extent becomes a mere matter of money. With a nucleus of a Transport Service formed upon such principles, we shall be enabled to place our small Army in the field, with the full confidence of having provided for one of its most essential wants, and of having guarded it against one of the main causes of failure in warlike operations.

Lieutenant-Colonel LONSDALE HALE, h.p., R.E., &c., &c.: In conveying, tactics occupy a subsidiary position with respect to the manipulation of the convoy and the mode of conducting it. The enemies whom convoys would have to dread in future are mounted infantry, armed with long-ranging rifles, and I would like to know how it was proposed to meet attacks of that character. I think that the commander would find himself in a very awkward position, and would have little to expect but annihilation. I could not admit, moreover, that for practical purposes the length of ground covered by a convoy could be ascertained by a mere multiplication of length of wagons and teams by numbers. Every one with the slightest experience of convoy work knows how the train of vehicles lengthens out, setting all calculations at defiance. My own small experience in Zululand, where in one case a large train had to pass, in a distance of 8 miles, over a swamp, through a difficult drift, across a bog, up and down a long and steep hill, over a narrow bridge, and, finally, up to the plateau where it lingered, impressed on me how the successful defence of a convoy depended far more on the working of the vehicles than on tactical measures. I wish that some one with personal experience of the system adopted by Sir Evelyn Wood in his column, which I have heard was admirable in this respect, were present to give an account of it.

Mr. E. B. DE FONBLANQUE: There are many gentlemen present more capable than I am to touch upon the principal subjects introduced in this lecture, but from my own experience I am so convinced of the absolute impossibility of fixing the responsibility of the Supply Department, unless you gave it the full control of the necessary transport, that I would urge that point as being one of the essential features in the future organization of army transport. It was laid down as the main principle of Lord Strathnairn's Commission, and the control system then introduced was based upon that principle. The Control Department has now been done away with, and we have reverted to the old system of divided responsibility and decentralization. As long, however, as the Commissariat is responsible for feeding the troops, so long must it have its own independent transport, and logically it follows that every other department charged with supply duties must in like manner, if it is to be held responsible, have its own independent transport. The effect of such an

arrangement is of course to create a very much larger expenditure and to necessitate a very much larger Transport establishment, but I am perfectly convinced that the more the question is looked into, the more it will be admitted that it is utterly impossible to enforce responsibility while the department that has to furnish the supply is made dependent upon another department for the means of collecting, carrying, and distributing that supply. Colonel Hale expressed a hope that there was some Commissariat Officer present who served in the Zulu Campaign. I am happy to see that my friend Sir Edward Strickland, the Commissary-General of that campaign, is here, and I am sure he will have some interesting remarks to offer to us on the subject of the lecture.

SIR E. STRICKLAND, K.C.B. : I heard with great pleasure a good many very practical remarks made by the Officer who preceded me and who entered into the practical working of the very important question with which I am acquainted. The lecture itself is one which certainly has given me exceeding pleasure, particularly that part of it which touched upon the organization of the transport of the Army, because it holds out hopes that the time has now come when anything like an invidious feeling, or what is usually termed friction, between two most important departments of the Army will cease, and, when we enter upon the next war, that we shall find the old Commissariat and Transport Officers working hand in hand together without the slightest friction, trying to work out one great common end, that is, the success of the campaign, and therefore the good of the country. It has been my fortune to have seen a great deal of rough campaigning both in New Zealand and in Zululand, and there is perhaps no more instructive field for understanding and entering into the details and difficulties of transport than in those two countries. Sir Evelyn Wood organized, in perfect harmony with the Commissariat, the whole transport of his division ; he acted in perfect unanimity with my Officer, Mr. Hughes, and he always kept me accurately informed of his proceedings. The result was, as Colonel Hale said, the transport of the First Division was thoroughly well carried out. It was perfectly marvellous to see the manner in which the transport of that division was carried out under great difficulties ; and its perfection, when the campaign was ended, stood out in very bold contrast to other divisions where the transport was very much otherwise managed. In other divisions there was a much more heavy expenditure of money, a greater loss of life, both in animals and men, and an excessive breaking down of wagons. Thus, the general cost of the transport services of these divisions became enormous. The same principles that guided General Wood were not followed out everywhere. Major Shaw has said that we cannot conceive it possible that any General Officer nowadays would go into the field without being certain that he had a proper transport, and that that transport should be essentially military, that he would stake his whole reputation by doing so. I venture to say that the same idea applies to a Commissary-General. I would not myself take the Commissariat charge of any troops in the field if there was any attempt whatever made to take from me the thorough command of my transport. I say this as the result of a great deal of experience, that a Commissariat Officer cannot perform his work if the means of doing so are taken from him or if he is interfered with in any way in carrying forward his supplies and in following up the Army. If responsibility is given to him, it is but fair to give him the means of carrying out his work, otherwise the sufferings of the Army may be very great, and the ultimate consequences highly perilous to the State. This brings one to another question, and one of great importance as regards the real principle on which the transport of the Army ought to be provided. There are those who argue that each department—we will say medical, engineers, ordnance—should all have their separate transport, and the Commissariat should merely be put upon the same footing with them as regards transport. But there must be one general dépôt, and it must be under some supervising power. It must be in the hands of a man of good administrative ability, not of theory, but of good practical knowledge. He should be an Officer who will work thoroughly well with everybody. You cannot find the fitting man every day, still he must be provided, and he should be the custodian of the transport of the Army. In the majority of cases transport dépôt has been found by the Commissariat, and that department has been the dispensing channel of transport to the Army. We are so now practically, although the purse is taken from us.

The purse is removed from us, but we have the same command over it now as we ever had; therefore this change need not in the least interfere with existing systems regarding the purchase of Army transport. I should regret to see another department established for transport, because I think the principle of subdivision is being carried rather too far in our military administration. I do not see that for the present we can do better than let the transport of the Army remain in the hands of the Commissariat, which has hitherto worked it well, and I would make the Commissariat be the nursery of the transport of the whole Army. I wish to see a school of transport duty established here. It is a most important duty; it requires an Officer of considerable intelligence, tact, judgment, health—a man who can stand any amount of hard work and always knows exactly how and where his transport is employed. Really good men are always wanted for transport work. Up to the present day it has been considered rather *infra dig.* to be Transport Officers. That idea must be removed; and rely upon it any Officer who goes into the transport service will always say he has had one of the most interesting duties to do of any Staff Officer going. It is of little use talking of these matters unless one suggests something. I will, therefore, suggest two things; one is that a department be established for transport in connection with the Commissariat as now established, following out exactly and precisely what the names indicate—a Commissariat and Transport Department. I would have the Transport Department established on such footing that it could be expanded to meet contingencies much more easily than it can under present circumstances. I would further drill and practise the Officers and men a great deal in railroad work, in embarking and disembarking, and with pack animals. I have had very many military Officers serving under me, and many have turned out exceedingly good Transport Officers. I used to tell them they must learn to understand that the wagons and horses were loaded properly, and I used to teach them how to do it. A great deal of detailed knowledge is necessary to organize transport, *e.g.*, with pack animals it is necessary to go behind them and before them, to see that the load is perfectly balanced. The Officer must take the trouble to do this, and his eye will very soon show him when he has done his work well. Detailed knowledge in their work is essential to Transport Officers, especially in the field, otherwise great evils may arise and many animals lost by sickness, or ruined by sore backs and galls, from being badly loaded or made to work in bad harness.

Captain G. W. COCKBURN, late 42nd Highlanders: The only thing I have to take exception to in the very excellent lecture we have listened to, and which perhaps I may take exception to with the greater grace as an old Staff Officer, is one little remark in which Major Shaw praised the Staff Officer as being likely to command the escort better than the regimental Officer. As an old Staff Officer I cannot allow that; I think the regimental Officer will probably be quite equal to the Staff Officer to command his own men in action. I have a question to ask the lecturer as to what he thinks of a plan I have long had in my head of every regiment having its separate transport, so that any regiment on being ordered out at a moment's notice, should have its transport with it, and not be dependent upon any Commissariat or civil Officers at all. It might cost a little more, but I think you would find that there would be a great absence of the friction, which I have felt myself continually, of having to run away to get transport that we are not used to; and if it was part of the regimental system the regiment would at any moment be able to move anywhere. Colonel Hale seems to point to the uselessness of attempting to defend the convoy at all. However difficult the thing may be, I suppose we must try and do it, and I quite acknowledge the great difficulty. These distances that are to be kept, look very well on paper, but as to the difficulty of putting it in practice, I am sure every Officer who has been in command of convoys, as I have years ago, must thoroughly back up what Colonel Hale said. Mr. de Fonblanque seems to support my idea that each regiment should have its separate transport. Sir Edward Strickland claims that the Commissariat must have the command of the *purse*. I also agree that they must have, and also the command of the *persons* of those under them, on whom they have to depend to carry out their orders. The lecturer was good enough to allude to Major Furse, and this must be another excuse for my having the boldness to rise in this meet-

ing. The Service owes a great deal to Major Furse for that very excellent book which he brought out and which fell so dead in the Service; the more so as I had the honour and pleasure of publishing that book for him in his absence, and though I sent a copy to every Adjutant in the Service, only two even thanked him for the present. It is very disheartening for a person who has given so much time and thought to a subject to find so little notice has been taken of it, and I thank the lecturer in his name for having given him that meed of praise so justly his due for having been the pioneer of this most important of all military subjects. I quite agree with Sir Edward Strickland that the Officer in charge, the Commissary-General, should have entire control of those under him, but at the same time I do not see that his remarks at all tend to upset my favourite hobby of seeing all positions in the Admiralty, War Office, and Commissariat, Post Office, and India Office, held by combatant Officers and men from the Navy and Army, who would be more likely to pull together with their combatant brethren than the civil element. I think those things should be kept as rewards for faithful service, and we should find from our combatant ranks men perfectly fit to fill the positions I have mentioned, and now generally held by the Civil Service, for all, or nearly all, of which I would make the Army and Navy the stepping-stone, and a certain amount of service therein a *sine quâ non*.

Deputy Commissary-General M. B. IRVINE, C.B., C.M.G.: An incident occurred during my service which will bear out what was said by the lecturer, that all Officers of transport or commissariat should be combatant Officers. I was the senior Control Officer during the Ashanti War, where the whole of our transport was performed by native carriers. We required a large number of persons to superintend them, and had to obtain the assistance of combatant Officers. Luckily Sir Garnet Wolseley was able to place at my disposal Colonel Colley, now Sir George Colley, as able a man as we have in the Service. Colonel Colley and the special service Officers with him organized thoroughly the transport under me, but Sir Garnet Wolseley had not Officers enough to give him up entirely to me. He not only was appointed Director of Transport but also Commandant of the Line of Communications, and to show how useful it was having the two duties combined, upon one occasion the carriers deserted in a mass; the result was the European troops had to halt on their march to the front, and everything was at a standstill. Colonel Colley got information that in some neighbouring villages a lot of these carriers were hidden away and that the villagers had been harbouring them, and he as Commandant of the Line of Communications was able then and there to take a small body of troops, recover his carriers, burn the villages, and, coming back, we were able to go on. Had he been but a Commissariat Officer he could not have done that, and he would not have got his carriers. At the conclusion of the war Sir Garnet Wolseley, in his report, said he considered that in a war like that in Ashanti it was absolutely necessary that the Officer in charge of the transport should also be Commandant of the Line of Communications.

Captain S. C. PRATT, R.A.: Allow me to say a word about the tactical part of the question—the distribution of the troops guarding the convoy. I believe it is in accordance with the usual text-books, but on consulting most of the books on petty warfare, you will find that they base the distances in the distribution of troops on the supposition that they are mainly liable to attack from cavalry. It is recognised by the most recent writers that the line of resistance is based on the considerations of keeping the fire of artillery off the troops. The question of long-range fire, not only of infantry, but also of artillery, is not taken sufficiently into consideration by distributing the troops along the road on which the convoy is passing. What you have to fear nowadays when you have an infantry escort is not the attack of isolated bodies of cavalry, but of a few guns, supported by cavalry. Therefore, what you have to do is to keep off the fire of the guns, and that cannot be done by putting bodies of troops between the wagons along the line of road. It seems to me in the same way as you have to stretch the distances on the outpost line on account of long-range fire, so along the line of convoy you must lengthen your distances; you must have your advanced guard more than 1,000 yards to the front, and the main body instead of being on the road should be a considerable distance to one flank or the other on an exposed flank in open country at least 1,000 yards; if in an

intersected country, where troops are confined to roads, then it should be not on the road on which the wagons are, but on one of the neighbouring roads if possible. One other point, as to the similar question of protecting the convoy from long-range fire by parking them. It may be useful in the case of defending against infantry, but from the example Major Shaw has worked out before us, I think the essential principle in parking, if such should be unavoidable, should be not to put the convoy up on the top of a hill in an exposed position for guns and infantry to fire at it, but that we should utilize the cover afforded by villages and woods in the neighbourhood. I think the position of Major Shaw's guns in the first instance was considerably better than the one he removed to afterwards, with the wood close to its flank.

Major SHAW: Lieutenant-Colonel Hale has suggested that I have rather underrated the difficulties of the defence of a convoy, and that I have not dwelt enough upon the undoubted advantage which he considers the assailants have over the defenders in the attack upon a convoy. I can assure Colonel Hale that the impossibility of including every branch of this subject within the compass of a short lecture has alone prevented my demonstrating, to his satisfaction, that there is no difference of opinion between us on the point he has raised. I have found it necessary to condense my lecture so much, in order not to exhaust your patience, that I have been unable to do more than touch upon the question of the attack. Had I entered upon it at any length, I should have certainly shown that, in nine out of ten cases, the defence of a convoy cannot be made good against the well-directed attack of a properly constituted and sufficiently strong assailing force. So far I go with Colonel Hale; but I cannot for a moment concede that this or any other consideration should affect the extent of the measures to be taken to secure the safety of the convoy, as it would surely be the duty of the commander, if attacked, to make every disposition for defence, and to spare no means of resistance, even though his chances of success were very small. Thus, in a case of threatened attack of the general nature I have indicated, I think the commander would act rightly in parking his wagons and in taking up as good a defensive position as circumstances will allow, even though he could hardly hope to save his convoy if assailed by a strong force, more especially by one composed of the three arms.¹ Lieutenant-Colonel Hale alluded to the awkward position in which the commander of a convoy is placed when he feels that, if attacked, he cannot save his charge, and that utter annihilation must be its fate. I can fully support the speaker's personal experience on this head by instancing one of my own. During the New Zealand War, being on the march with a large convoy, I found myself brought to a halt shortly before midnight, on a very dark road, which passed through what in Europe we should call a forest, by a breakdown of some of my carts. The place was not far from where a convoy had been, a short time before, attacked by a large force of natives, the escort suffering considerable loss; it was an exceedingly nice position for the attack of a convoy, but certainly not one I should have chosen to defend. The question of the tactical disposition of the escort was not entered upon on this occasion, as I am sorry to say the men composing it, furnished from the local militia, disappeared in the darkness, and were seen no more that night. I had to send on to the nearest redoubt for assistance from the regular troops which garrisoned it, but even after their arrival, if we had been assailed by a strong force of natives, we must, as Colonel Hale has put it, have been nearly annihilated. I am, therefore, also of opinion, although time prevented my alluding to it in my lecture, that there are many circumstances under which, when on convoy duty, a commander feels exceedingly helpless and can only pray that he may not be assailed. As regards the attack of mounted infantry, I believe it would be exceedingly difficult to withstand, unless you could meet it, or rather forestall it, by like tactics, being either escorted by a similar force, or provided with cavalry trained to dismounted service, who could go out to meet the enemy and keep him at a distance from the convoy exceeding the range of his weapons. With reference to the point

¹ In the particular case instanced, the attacking force, although strong, being of cavalry only, the convoy would probably succeed in holding its own and in driving off the enemy.

mentioned by Mr. de Fonblanque, there can be little doubt that a well-founded feeling exists in favour of supply and transport being retained under the same controlling authority, and as the new organization of the Commissariat tends in that direction, I need not dwell further upon it. I am quite of Sir E. Strickland's opinion that a School for Transport should be established. We have schools of instruction for a host of other things—gymnastics, signalling, musketry, equitation, &c.—for everything, in fact, except for teaching transport duties, than which there are none more difficult to learn in a short time, and without proper aids and appliances. For such a school there could be no better place than Aldershot, and I hope we shall see one established there before long. The next speaker, Captain Cockburn, took some exception to my saying, in the case mentioned of Captains A. and B., that the Staff Officer would probably of the two be most competent to command. He based his remarks upon the general assumption that a regimental Officer makes a better commander for his own men than a Staff Officer. I do not at all dispute this; quite the reverse; but in the instance I brought forward, I supposed both of the Officers and the men to be of the same corps, and therefore the Staff Officer would have been in the position of commanding his own men equally with the regimental Officer. This being the case, and other qualifications being equal, I am still of opinion that Staff experience and training would give the one Officer a great advantage over the other, and that, of the two, the former would probably be the more competent to command. The suggestion made to increase the regimental transport, so as to render every corps independent of departmental transport for all purposes, must be met by the fatal objection that the cost would be simply enormous. The train so formed would also work very indifferently in time of peace on home transport duties. I trust that Major Furse will, before long, give us the benefit of his acquaintance with the subject of transport in some further published notes. Judging from various papers in manuscript which he has lent me to read, I can assure you that he has taken great trouble in working up the question, and has gone into it thoroughly in all details of organization. The instance referred to in Ashanti strongly supports my view, that Officers having the direction of transport in the field should retain their executive powers of command as combatant Officers. The last speaker has criticised the distribution of troops in the convoy scheme laid out on the model. This distribution is made on the principle of dividing the force into several formed bodies, disposed where most required in the column, with a large portion of the escort kept in reserve by the commander, which also accompanies the march of the convoy until required for action. Suppose this portion of the escort (call it reserve, or not, as you like), upon whose fate that of the convoy must more or less depend, to march, as suggested, 1,000 yards at least away from the convoy; who is to command it? It is a leading principle in tactics that such a force should be at the disposal of the Commander-in-Chief for action at the crucial moment. You must therefore either infringe this rule, and separate the commander a good part of a mile from his reserve, or else you must remove him from immediate supervision over his convoy during the whole or greater part of its march. Against long-range infantry or artillery fire, the troops, if close to the wagons, would no doubt be of little use; but the reserve might be moved up to a favourable position after notice of attack, always provided that reconnaissance is well carried out. It therefore simply comes to this, that in the present day your reconnaissance must be so extended and so well executed as to enable you to have time to move up to advanced positions to receive the attack of the enemy; unless it happens that the hostile force is solely composed of cavalry, when the convoy may be locally defended. I am, hence, still of opinion that the reserve should, as a rule, march with the convoy; but it must be always ready to be detached to any desired position, if notice of the enemy's approach is given by the advanced scouts. As to the second position of the guns assumed on the model, it is a trifling matter only, and I am always pleased to yield to an artillery Officer on such a point. I would merely, then, explain that, although the wood might appear to render the position untenable or bad for guns if not held by infantry, I made it one of the special conditions that it should be so held from the first. It is a small wood only, and infantry could line the outer edge. The stream on this flank also renders it very secure against the attack of cavalry. Add to this, that the guns are intrenched in front, and have a

safe retreat open to the rear; they also command the whole line of approach of the enemy. It appeared to me that if retained on the left flank they would have been much exposed, without any commensurate advantages. These were my reasons for moving the guns to their second position.

The CHAIRMAN: We have listened to a most instructive and, I think, suggestive lecture. I have very little to say on the subject which could add to the very interesting remarks we have heard, not only from the lecturer, but also from gentlemen who have taken part in the discussion. I am very sorry no Officer who served in the Afghan Campaign is here, and more especially Sir Michael Biddulph, because he told me on one occasion that he drilled his transport—a subject which was adverted to by one of the speakers—that he actually drilled his transport and practised attacks from varying directions on the transport when in movement. Mention has been made of a school for transport. There is an admirable school for transport in the Prussian Army, which is the train. Every army corps has a train battalion which belongs to it. That train battalion is only kept up to a modified extent in time of peace, but is kept up with a capability of very large expansion by the fact that the men in the train, with the exception of non-commissioned officers and a nucleus of three years' soldiers, are men who only serve six months, are thoroughly drilled in driving, practised in train duties, and then sent back to their homes, being at once replaced by a corresponding number of recruits. Therefore, when war breaks out, the German Army can mobilize at once a very large transport, composed of men who have been instructed during peace. The whole of the carriages of the Army are kept up in peace and stored at the head-quarters of the army corps, as are also the carriages of every battalion and regiment in the Service. There is a regimental transport in the Prussian Army which is of the greatest possible use, which does not profess to carry more than a very small portion of the requirements, but still so much as to render battalions, regiments, and the artillery independent of the larger bodies of transport. I wish to say one word about this model, because it gives me the opportunity of saying to an Officer serving under myself, for whom I entertain a very high value, how much Major Shaw has done in the way of instruction by starting the subject of these models. We have two at Aldershot, and five either completed or in process of completion at other stations where there is a Garrison Instructor; and on more than one occasion I have gone down to Aldershot for the purpose, first of hearing Major Shaw lecture, and also of seeing what was even more interesting, if he will allow me to say so, a minor war game played upon one of these models. I can only say that taking the chair at his lecture has given me the opportunity of saying to him in public what I have expressed to him in private, that I consider he has rendered to the Army one of the most valuable services that could possibly have been rendered, by his construction of this system of models in relief, and by the very great care and assiduity with which he has carried it out. I hope, therefore, you will join with me in offering to him a sincere and hearty vote of thanks for the very interesting lecture he has given us.

Friday, April 30, 1880.

SIR RUTHERFORD ALCOCK, K.C.B., in the Chair.

THE CHINESE ARMY.

By Captain WILLIAM GILL, R.E.

WHEN first asked to read a paper on the Chinese Army, I hesitated, for inasmuch as amongst the heterogeneous forces that compose it there is a complete want of what we understand by organization, the Chinese Army resolves itself into an unwieldy mass of men and *matériel*, which, even if complete information were to be obtained, would hardly furnish subject-matter for a critical audience. And even now it can by no means be said that we have at our disposal facts and figures sufficient to give us such a knowledge of the military strength of China as we have of European States, and I feared that I should fail to satisfy the just anticipation of those who might come here to-day with the hope of forming a fair idea of the Chinese Army.

Nor can I lay claim to the possession of much original knowledge, and the notes that I bring forward are little better than a compilation from other published works. Consideration has, however, led me to hope that, although the description of, and the information regarding, the Chinese Army that I can give, is meagre in the extreme, yet that its anomalous condition in the present, and the consideration of its possible future, will afford topics which are not only of the highest interest, but which must also present matter for deep thought as to the destiny in store for this most wonderful nation.

In order to understand aright the present state of military affairs in China—a condition of things that I have called anomalous—we must first glance at the later history of the Chinese Empire; and in order to form an opinion of the future, it is necessary to make an effort to comprehend the mental state of the Chinese nation.

I shall, therefore, commence by a brief account of the establishment of the present alien dynasty.

I propose, then, to give as good an account as I can of the present military forces of China, and to conclude by a consideration of future possibilities, based on the idiosyncracies of the Chinese character and on the Chinese system of administration.

It was after many strange vicissitudes, after the rise and fall of many dynasties, after the appearance and extinction of Mongols, Kins, and Khitans, that the native Chinese dynasty of the Mings was established in 1368.

During the reign of the eleventh monarch, the Eastern Tatars, or Manchus, first became numerous and troublesome. The first chieftain

of these tribes who attained celebrity was Tien-Ming, who, in the reign of the thirteenth Ming Emperor, published a manifesto in which he vowed vengeance against the Chinese for offences committed against him; and after his death his son continued the war he had commenced.

The misgovernment of the latter Mings had so alienated the affections of the Chinese people, that the country was overrun with bands of insurgents, the leaders of each asserting a claim to the throne, and all of them rendering their country an easier prey to the warlike Manchus, who not only strove to subdue the Chinese, but endeavoured also to bribe the troops from their allegiance.

At length a native rebel, Le-Tze-Ching, who had, after eight years' fighting, established his power over one-third of the country, entered Peking in 1644, when the last Ming Emperor, deserted and unsupported, first stabbed his daughter and then hung himself, thus ending the Ming dynasty, which had lasted 276 years.

In spite of years of internal troubles, the supporters of the Ming dynasty had still on the borders a General, Wu-San-Kwei, at the head of an army efficient enough to keep off the Manchus.

And here it may be worth while to devote a few words to the consideration of the theory and practical working of the normal Chinese autocracy.

"The reigning Emperor of China is absolute because he is in the eyes of his people the Son of Heaven, the chosen agent and representative on earth of the supreme ruling power or providence—of which the Chinese have always had a lively conception under the name of Teen or Heaven.

"The idea of divine right by birth has never been known to the national mind of the Chinese, and in modern times it is not positively known during the reign of any one Sovereign who will be his successor in the exercise of the divinely delegated power.

"Both in theory and in practice the primary claim to the succession is given by the death-bed or the testamentary nomination of the reigning Sovereign; but it is by good government alone that the nominee can fully establish his divine right.

"When by good government, in accordance with the divine principles as laid down in the national sacred works, he has given or preserved to the people peace and plenty, and as a consequence, established himself in power by his hold on the national esteem and affection, then only will they consider him, and then only will he consider himself, the veritable Son of Heaven.

"Natural affection has almost always led to the nomination of a relative, mostly a son, but six of the Emperors of the present dynasty have not been the eldest sons of their fathers, while the fact is ever present to the national mind that the revered ancient monarchs Yaou and Shun each passed over his own son, because unworthy, and nominated a stranger."¹

Wu-San-Kwei, therefore, now found himself at a crisis at which he, like every other Chinaman, had to decide for himself whether the

¹ "The Chinese and their Rebellions." By T. T. Meadows.

"divine commission had been withdrawn from the present house of Mings, and if so to whom it had been given.

"Had Wu-San-Kwei and his army recognized Le-Tze-Ching as the new divinely appointed, it is possible that a new native dynasty would have been established, and that, instead of the Manchus conquering China, the Chinese would have annexed Manchuria."

Wu-San-Kwei, however, decided that the rebel Le-Tze-Ching at all events was not the new recipient of the divine commission, but, as he could not hope at once to fight him and also to keep out the Manchus, he decided to invite the co-operation of the latter, in the hopes that when he should have succeeded in crushing the native usurper he might find a means of expelling the foreign barbarians.

"It had always been an established principle that the true policy towards all non-Chinese people or barbarians was to keep them off; a temporary pressure of circumstances induced Wu-San-Kwei to violate this rule, and the consequence was the subjection of his country to barbarians, and ultimately the extermination by them of his own family.

"Although looked on historically as a well-meaning but unwise statesman, he was undoubtedly an able General. He exercised a decisive influence on the fortunes of his country, and whenever he fought, either with or against his self-imposed auxiliaries, the Manchus, he was always successful as a warrior."

It was in the year 1644 that at length the Manchus, with the aid of Wu-San-Kwei and many Chinese adherents, entered Peking and declared their young King Emperor.

"Wu-San-Kwei had been previously induced to leave for the west in pursuit of the usurper Le-Tze-Ching. At the death of the latter rival the Manchus had recourse to the old system of feudal government, and by creating Wu-San-Kwei a vassal prince of one or two of the western provinces, obtained from him and the people under him an acquiescence in the domination of a Manchu Sovereign at Peking."

After a seven years' struggle, and by constituting three of the Chinese adherents above alluded to vassal princes of three south-eastern provinces, that part of China was brought to a state of semi-subjugation.

Later, about 1673, when Kang-He, the second Emperor of the Manchu dynasty, attained his twentieth year, Wu-San-Kwei threw off his allegiance and marched an army northwards against the Emperor. The southern vassals joined him, but owing to disunion amongst the Chinese, Kang-He, who was a Sovereign of rare ability, and who, while retaining the hardy habits of his progenitors, had had the advantages of a Chinese education, succeeded in the course of a ten years' war in completely conquering the south-eastern provinces and incorporating them into the centralized system.

Wu-San-Kwei died in 1678; in the following year the armies of Kang-He, the Manchu Emperor, marched westwards into his State, reduced it to subjection, and put every member of his family to death.

¹ "The Chinese and their Rebellions." By T. T. Meadows.

His name, however, is not forgotten in those distant regions; and at the present time the river that winds at the base of the glorious mountain of Nen-Da is spanned by a bridge said to have been built by him, and across which he marched to chastise the barbarous mountain tribes.

Still the Manchus felt that their military power was the original cause of their advent to dominion, and hence they naturally endeavoured to retain it intact. Besides a very large Tatar garrison at Peking, they established smaller garrisons in many of the provincial capitals and in other important points in the provinces.

The forces of the alien Manchus are now known as the Banner Army, so called because the three nations that compose it are ranged under eight banners.

These three nations are—

1st. The Manchus.

2nd. The Mongol Tatars.

3rd. Chinese descended from those adherents of Wu-San-Kwei who entered Peking with the Manchus in 1644, and who afterwards furnished vassal princes for the south-eastern provinces.

They number roughly some 230,000 non-commissioned officers and privates, besides 40,000 élèves (paid expectants to the higher ranks), and 5,000 artificers and followers.

There are about 86,000 in Peking, another 50,000 are distributed about the Province of Pe-Chih-Li. There are 40,000 in Manchuria, and the remainder furnish the Tatar garrisons of the chief cities throughout the Empire.

This force is in 41 grand divisions, not all of the same strength, each with its proper proportion of Officers of the nine grades.

The first is the Imperial Body Guard, 1,700 strong, for guarding the person and apartments of the Sovereign.

Two others, 16,000 altogether, furnish guards for the palace gates, &c.

The safety and order of the city of Peking are in charge of one of the grand divisions, called Pu-Kiun-Ying, numbering some 23,000 non-commissioned officers and men. 15,000 men are daily on duty, and are charged with the prevention of robberies, murders, &c.

There are small contingents for guarding the Imperial mausolea within and beyond the Great Wall.

Six grand divisions, numbering altogether some 40,000, form the cordon of the 25 garrisons, and are stationed in the principal cities throughout a tract of country bounded on the north by the Great Wall from Kalgan to Shan-Hai-Kuan, and extending thence to the sea.

Four of these garrisons together forming the left wing cover Peking to the south-east, another five similarly form the right wing and cover the capital to the south-west.

Six garrisons, with their head-quarters at Mih-Yun, are extended to the north-east and west.

The Shan-Hai-Kuan command of five garrisons is spread from the sea along and within the wall as far as the Hsi-Feng-K'ou Pass.

Five garrisons form the Kalgan command, and there is besides a

strong garrison under a Tu-Tung (almost the highest military Officer), at Jehol, the summer palace of the Emperor.

But by far the most important of all the Banner Forces is that which is known as the Hiau-Ki-Ying, and which, according to Sir Thomas Wade, is the only corps which can have any claim to be considered as an army. They number some 36,000, besides 26,000 élèves.

But it is commonly believed that of the whole Banner Forces throughout the Empire, at the present time, no more than 30,000 of the Hiau-Ki-Ying in Peking, with perhaps another 18,000 of those that make up the 25 garrisons, can be said to be effective.

Even of these the whole do not, it is believed, drill in the European fashion; and if, at this date, they are all armed with modern weapons, it is as much as can be said.

Information, however, is most difficult to obtain in Peking. Military exercises are almost universally carried on in the Imperial hunting park—an immense tract of country surrounded by a wall, the access to which is jealously forbidden to foreigners.

In, and perhaps also in the neighbourhood of, Peking, there is a force of field artillery with modern breech-loading guns, but of their numbers and effectiveness I can form no idea.

In the remote Western Provinces I can, from my own observation, certify that what we should call soldiers have no existence; the men are there, doubtless, so are their wives and families, but bows and arrows, so far as I saw, were the weapons with which they were armed; and although it is by competitive examination that promotion is gained, when it is borne in mind that, for the most part, in those provinces remote from the capital, at all events, feats of physical strength and proficiency with the bow are the subjects in which the aspirants to military honours are tested, it will be readily conceived that the vast number of men borne on the strength of the Tatar Bannermen are little better than a paper army.

Thus, like a mighty rock in the bed of a torrent, has China for centuries resisted the stream of civilization. Will it at length yield, and sweep onwards with resistless force? is a question that must engage the attention of all thoughtful minds.

This same army, however—contemptible though it may appear in its present condition—does, nevertheless, offer the basis on which may be raised the fabric of a complete and organized force. From the little that I have said, it will be seen that the germs of an organization are even now not wanting. Life may some day be instilled, and a power of terrible might spring into existence.

The numbers that I have given are, as far as can be gathered, those mentioned in the Imperial books as receiving pay; but as the Manchu soldiers always have with them their wives and families, the numbers in the Tatar cities are probably very much in excess of those reckoned. These Tatar cities, in fact, form with their inhabitants, species of military colonies.

Large cities in China are always surrounded by a strong wall, and many of the principal amongst them are divided into two parts by a wall as strong as that that surrounds the entire city.

One of these parts forms the Tatar city, to which I have just alluded, and which is entirely inhabited by these Bannermen and their families, and the other part is the regular Chinese city. There is not, so far as I am aware, any instance of a Tatar city entirely by itself.

The mere sight of the garrisons, Mr. Meadows observes, has been a continual reminder to the Chinese of their being under the dominion of an alien barbarous race; and as the latter have always borne themselves with much of the insolence of conquerors, their acts have been a constant excitement to disaffection. These garrisons form one deviation from the fundamental principles of Chinese government, as a partial attempt to substitute a physically supported despotism for a morally supported autocracy.

The next force that we have to consider is the Luh-Ying, or the troops of the Green Standard.

This force is composed entirely of Chinese, and is often by foreign writers inappropriately styled militia. It is, in fact, the Constitutional Army of China—the Bannermen being, as I have pointed out, the soldiers of an alien, though suzerain Power.

The duties of the Luh-Ying are, however, by no means confined to those of a European army; the responsibilities of a police force are imposed on them; by far the larger portion of the Luh-Ying land force seems to be devoted to the duty of preventing robbery, contrabandism, and other crimes. They escort stores—bullion to the Mint, or criminals from one jurisdiction to another; they assist at the collection of revenue; and the Officers charged with the supervision of river embankments, or the important duties of transmission of grain, have a certain force of Luh-Ying at their disposal.

Besides the land force, the Luh-Ying mans the Navy of the seaboard provinces, and, as we have seen in the Banner Force, a distinct organization of divisions and garrisons, each under its General; so there is for each of the eighteen provinces a Chinese Army, complete in itself, and under the supreme control of the Governor-General of the Province; and also for the seaboard provinces a naval force.

So completely are these forces under the Governors-General of Provinces, that even the Imperial Cabinet at Peking finds it very difficult, and sometimes impossible, to induce these Officers to move their army beyond the borders of their province.

The strength of these provincial armies varies with the size of the province, and with the duties they have to perform.

Thus, in Kwan-Tung there are 43,000 of what are called mobile infantry, 22,000 garrison infantry, 2,000 cavalry, with nearly 800 Officers of various grades.

Of these 68,000, about one-third are water soldiers, forming a naval force cantoned on shore; for this province has an extensive sea coast, and is liable to the depredations of pirates.

A large land army is necessary also, not only on account of its extensive area, but also because there are within its borders wild mountaineers that have to be kept in order.

In Ngan-Hui, again—an inland province inhabited exclusively by Chinese—there are no more than 8,000 of the Luh-Ying.

Taking all the provinces, the average for each is about 34,500 men, and 640 Officers—one Officer to 52 men.

Over each province in China there is generally a Governor-General,¹ or Tsung-Tu; but, in some cases, there is but one Governor-General for two provinces. Under the Governor-General there is in every province an official called a Fu-Tai, or Governor. This latter, though a civilian, is the Commander-in-Chief of the Armies.

In this command he is assisted by Generals and other military Officers, but the chief command of an army, whether in peace or in war, is usually bestowed on civilians; for the Chinese hold military men of all grades more or less in contempt, inasmuch as the latter do not pass the literary examinations, and are without those literary qualifications and degrees which alone entitle Chinamen to the respect of their fellow-countrymen.

The Chinese think that a literary official whose talents have been severely tested, both by examination, and by the practice of often difficult official duties, must be superior in every way to a military official, who is unlearned, and whose talents have not been proved. They argue also that talented literati, who, even though they may not have been occupied with military matters, yet must in the course of their studies have read much of them, will be better acquainted with strategy, and in every way better fitted for the command of an army than an ignorant military official.

Nor are they altogether without reason. During the rebellion of the Tai-Pings, the Governor of Kuang-Si addressed a letter to the Governor of Hoo-Peh, urging the latter to send him troops as reinforcements. This letter dealt with many subjects, and in it the writer not only describes his own strategy with force and clearness, but he compares his own measures with those of the most celebrated Generals of history, such as Yang-Lao of the 10th century, and Sung-Pin, whose campaigns were fought 341 B.C., and with whose actions he was evidently well acquainted, he also shows a complete knowledge of the army organization of other ancient dynasties, and certainly in a large measure justifies the Chinese system of putting civilians in the chief command of the troops.

The Luh-Ying, or Forces of the Green Standard, are little more than a military constabulary. A small proportion are probably armed with modern weapons, some may be drilled in the European style, but though they must not be despised inasmuch as they, as well as the Banner-men, could with energy and skilful Officers soon be organized into a great and powerful army, yet as they are at present, they can be looked on as little better than a body of men, who would if called together be not very different from an armed mob. Indeed it is to be doubted if they are much, if at all, in a better state of organization, equipment, or discipline than they were some 30 years ago, when Sir Thomas, then Mr., Wade, wrote as follows:—

“But it is in the Luh-Ying Force that disorder runs riot, and the bulk and distribution of this considered, the picture of its condition

¹ This Officer is sometimes styled Vice-Roy by foreigners, but the title Governor-General is much the better of the two.

"drawn by members of the present Ministry best shows how defenceless
"in the arm in which her chief reliance should be placed, is this great
"Empire become."

Sir Thomas Wade then quotes amongst others the President of the Banqueting Court, who states that the troops of the Green Standard are unacquainted with the use of cannon, musket, sword, and spear.

Another laments that the Army is quite disorganized, the Officers falsify returns and make deductions from their soldiers' pay.

The ranks are half empty, half filled with vagabonds, of whom the weaker are incompetent, and the stronger in league with smugglers and robbers. Men whose names are on the roll send any fellow who has not the sense to earn his bread, as a substitute. Such desert before an enemy, or never wait to come in front of one.

In the letter to which I have already alluded, written by the Governor of the Province of Kuang-Si in 1851, that Officer speaks of "the cowardice of his troops." He says also "our troops have not a tincture of discipline, retreating is easy to them, advancing difficult." The troops were all alike useless.

In July, 1851, the *Peking Gazette* contained a memorial by the Lieutenant-General of the Canton Bannermen (a Manchu). He states that the Army has never recovered from the disorganization caused by the want of success in the British War, so that the troops do not attend to orders, regard retreat on the eve of battle as old custom, and the abandonment of places they should hold as an ordinary affair.

But there is yet another force to be considered, and it is a strange illustration of the anomalous state of things that exists in the Chinese Empire, that we find the Governor-General of the province in which the Imperial capital is situated in possession of a large army, and that the only force worthy of the name in the Empire.

Li-Hung-Chang is the powerful Governor-General of the Province of Pe-Chih-Li. It is believed that he is much feared at Court, it has even been whispered that he has aspired to be the founder of a new Chinese Imperial dynasty, and in any case it may be said that he is one of the most important men in China.

Li-Hung-Chang is a native of Seu-Chou in the Ho-Fei district of the Province of Ngan-Hui.

He was born somewhere about 1830, and started in life as a sort of pleader in the yâmens of his native province. When the rebels invaded Ngan-Hui he was in command of a small irregular force; he was invited to Nanking and became a secretary in the army of Tseng-Kwo-Fan, then Governor-General of the two Kiang, and who was successful as a General against the Tai-Pings.

Tseng eventually nominated him in 1861 to be Governor (Fu-Tai) of Kiang-Su, which province was at this time overrun with rebels; and it will be recollected that he acted with Colonel Gordon at Su-Chou.

In 1866 Li succeeded his patron Tseng-Kwo-Fan as Governor-General of the two provinces of Kiang-Si and Kiang-Su.

In the spring of 1870, he was ordered to march against the rebels in Shen-Si and Kan-Suh. At this time the Imperialist forces were

under Tso-Tsung-Tang (familiarily known as Tso-Kung-Pao), and had been defeated by the rebels, who previously to the arrival of Tso had been forced back by the General To-Ta-Jen, who was killed in battle in 1866; and when Li marched from Wu-Chang-Fu up the Han river, the city of Si-Ngan-Fu was completely surrounded with rebels, and many people in it had died of starvation.

Li-Hung-Chang was now in command of 40 battalions of the nominal strength of 500 men each; all these were armed with foreign arms of precision, and some of them had been drilled, more or less, by foreign Officers.

He had, however, scarcely arrived in Shen-Si, when the Tien-Tsin massacre took place, and he was called to Pe-Chih-Li, of which Province he is now the Governor-General.

When Li-Hung-Chang returned to Tien-Tsin, he left his troops in Shen-Si, giving the command of them to General Liu, who, jealous of his military superior, Tso-Tsung-Tang, made little use of this force, the very name of which had been sufficient to drive the rebels out of the Province of Shen-Si.

In 1871 Liu was replaced by Tsao-Chu-Men, who with 22 battalions of Li's troops marched westwards, the other 18 battalions returning with Liu to Pe-Chih-Li.

Of the present numbers and constitution of this army of Li-Hung-Chang, very little is known, and I regret that I am unable to do more than indicate its existence. Whether any of the 22 battalions left by Liu in Shen-Si have since returned to Pe-Chih-Li, I cannot say; but it is certain that Li-Hung-Chang has now a very large number of well-armed troops.

They are chiefly cantoned in the neighbourhood of Tien-Tsin, and they garrison the forts at Ta-Ku and Peh-Tang, which are heavily armed with Krupp guns.

In the army of Li-Hung-Chang, there is also a fair proportion of field artillery armed with Krupp guns.

The soldiers are mostly natives of Ho-Nan and Ngan-Hui (Li's native province). It is said that some are drawn from the Luh-Ying or forces of the Green Standard, many served under Li-Hung-Chang during the rebellion of the Tai-Pings, and some come from the ranks of the Tai-Ping rebels themselves.

In East and West Kan-Suh, the regular army as enumerated in the Imperial books should be some 10,000 Bannermen, and about 50,000 of the troops of the Green Standard.

But during the last ten years, armies have been despatched thither and beyond to Ili and Kulja, both from Yun-Nan, and as I have before stated from Shen-Si, and I am not aware that the materials exist for an accurate estimate of the total strength of the force that is now free to face the Russians.

The Yun-Nan army was that set free after the capture of Ta-Li-Fu and the final overthrow of the so-called Panthays, and which marched to Kan-Suh to assist in the war in the far west.

Very little is known of the composition of this Kan-Suh army, but as far as can be gathered, the total force employed by the victorious

General-in-Chief, Tso-Tsung-Tang, seems to have been some 60,000 to 100,000 men. Richthofen says, that in 1872 the Governor-General of Kan-Suh had the immediate command of 200 battalions, not counting the troops of Li-Hung-Chang, then under General Liu.

These were mostly, if not entirely, armed with breech-loading rifles, and there was also a fair proportion of field artillery with them.

That the performances of this army are highly creditable must be at once admitted. The march itself from Ta-Li-Fu of any considerable body of men would be sufficient to take a place in the annals of military achievements. No one who has not travelled in the East can form a conception of the badness of the mountain tracks, and the difficulties to be overcome; and at that time immediately after the terrible rebellion in Yun-Nan it can have been no easy matter to have fed the army in a country laid desolate and devastated by both sides in what was almost a war of extermination.

The march of these men and the other Chinese armies from Lan-Chou-Fu to the oasis of Hami, a distance of about 1,000 miles, a portion across a completely arid and waterless region in the fearful Desert of Gobi, must fill us Englishmen with envy, whose miniature armies are always accompanied by huge and cumbersome baggage-trains that would render feats such as these of the Chinese, utterly beyond our powers.

But at the same time it must ever be borne in mind that there is in no part of China at the present moment any force that in a European sense can be called a disciplined army.

I have quoted official reports written about 1850, on the state of the Luh-Ying, and I will now give the remarks of Baron von Richthofen, written in January, 1872, at Si-Ngan-Fu, where at that date a large number of the army that afterwards marched westwards were gathered together.

"Since my entry into Shen-Si, I have been constantly amongst soldiers and Officers. Among the latter there are men of a military turn of mind, who in time of war will do honour to their position. Nor are the soldiers, who are mostly from Ho-Nan and Hu-Nan, made of bad stuff. They have mostly a stout frame, and can stand fatigues remarkably well. But they are not animated by either a military or a patriotic spirit, and the only means to keep a slight discipline among them is the fearful power of capital punishment, which every Commander of at least one battalion wields over his own men. It is made use of liberally, and many are the soldiers' heads that are cut off by the executioner.

"Can there be any more forcible illustration of the complete lack of military spirit than this, that the executioner is one of the comrades of the criminal, and receives 500 cash (about 2s.) for cutting off his head?"

The victories of this Chinese Army are not difficult to account for; they are due not to the superior discipline or valour of the troops; it is probable that so far as valour is concerned, the Mahomedan rebels and the forces of Yakub Beg were at least their equals, if not their superiors. But their superiority lay in their arms.

I have already referred to the fact that the very name of Li-Hung-Chang's troops had been sufficient to drive the Hwei-Hwei rebels out of Shen-Si.

Of this event, Baron Richthofen remarks, "The fame of Li-Hung-Chang (or perhaps of his foreign arms) is so great that the rebels withdrew immediately on the approach of his troops, never engaging in a fight with them. No one of the soldiers of that army whom I met has ever seen a rebel. The whole province of Shen-Si was at once cleared of organized rebels, without bloodshed, none but stragglers remaining. The main body retired into Kan-Suh. . . . The province will remain in a peaceful condition as long as it is occupied by foreign armed troops."

The best armed and organized troops with which the Chinese Army with their Berdan rifles and Krupp guns had to contend, were those of Yakub Beg. The army of that potentate is thus described by Mr. Boulger: "The army of the Amir was divided into two bodies, the jigit or horse soldier, and the sarbaz, or foot soldier. The jigits were armed with a long single-barrelled gun and a sabre. The sarbaz, among whom are included the artillery, had gone through some regular drill and training. He was a regular soldier, and might be trusted in defence of his country up to a certain point. It is probable that Yakub Beg never had 20,000 trustworthy soldiers in his army."

When we consider the moral effect alone that must be produced on the mind of ignorant and superstitious people by the vague knowledge that their foes are armed with foreign weapons, of which they have the most exaggerated ideas, it will readily be believed that it was neither superior courage, discipline, nor generalship that gave such complete victory to the Chinese, but that these were due to superior arms and superior numbers directed by an all-powerful will at the capital; a will which, though it may be slow in making itself felt, is nevertheless felt and obeyed throughout the length and breadth of the Chinese Empire.

But this paper will hardly be complete without some consideration of the future; I have no intention, however, of clothing myself in the mantle of a prophet, but by some examination of the past, I hope that it may be possible to lay some slight basis for speculation.

And at the outset we cannot but be appalled by the magnitude of the task. We have here a nation that is spread over an area, the very vastness of which is itself difficult to appreciate; and its numbers even in proportion to the territory are still immense. This nation possesses an authentic political history for 4,200 years, and even at the time when our forefathers knew no other clothing than blue paint, it was almost the nation of the day.

This nation possesses no landed aristocracy, but you may find men in it who can trace an authentic pedigree for 2,000 years; and it boasts what no Western nation can claim in so high a degree—an aristocracy of intellect.

This great Empire has now lived through long ages of varied for-

tune, and it would be surprising indeed if a people that had survived so many and such great vicissitudes, had been conquered many times, and had each time risen superior to defeat, had absorbed one race of conquerors and had driven out another, did not possess some characteristic that would mark it as a peculiar people, and this characteristic is the individuality of the race. And it seems to me that it is only by an inquiry into the causes of this individuality, and of the long duration and stability of the Chinese Empire, that we can hope to speculate on its future as a military Power.

When first the Chinese nation became known to the West its stability was attributed to the doctrine of filial piety, which was and is universally accepted by the people.

It has also been ascribed to the geographical isolation of the Empire, and to the peculiar nature of the Chinese written language.

Another theory is, that it is due to the assertion of a Divine Harmony in the Universe, which has been throughout all ages the fundamental and ruling idea in every Chinaman's principles of action.

Mr. Meadows considers that the real causes of the unequalled duration and constant increase of the Chinese people, as one and the same nation, consist of three doctrines, together with an institution, by means of which the efficient performance of the work prescribed by two of these doctrines is attained, and by which a living practical belief in all three is maintained in the mind of the nation.

The doctrines are—

I. That the nation must be governed by moral agency in preference to physical force.

II. That the services of the wisest and ablest men in the nation are indispensable to good government.

III. That the people have the right to depose a Sovereign who either from active wickedness or vicious indolence gives cause to oppressive and tyrannical rule.

The institution is—

The system of public service competitive examinations.

Mr. Meadows observes:—

“In every case the institution of public service examinations (which have long been strictly competitive) is the cause of the continued “duration of the Chinese nation: it is that which preserves the other “causes and gives efficacy to their operation.”

It appears to me that the first doctrine enumerated by Mr. Meadows embodies the theory of the Divine Harmony—a theory that may perhaps bring a smile to the unthinking.

But those who have seen and felt that the Chinese character and ways of thought are not as ours are, will pause before condemning any theory, however insufficient it may seem, to account for the marvellous history we are now contemplating.

With regard to competitive examination, however, it must not be forgotten that the system was only introduced in the comparatively modern period of the Tang dynasty (circ. 700 A.D.).

The nation had then already existed 3,000 years, it was even then practically the nation of to-day; and surely, therefore, there must be

something deeper than the examination system to account for this marvellous individuality.

The formation of the character of individuals is a subject that has scarcely, if at all, been studied; the formation of the character of a nation must therefore be a gigantic task. Deeply interesting though it would be, the inquiry into the formation of the Chinese character is one that no one would lightly undertake, and I shall certainly not venture to discuss it here. I shall content myself with believing that the individuality of the Chinese race has developed itself with the nation, and that the roots of it lie buried among the crumbling ruins of dynasties, which may even yet, like the mounds of Nineveh, some day afford startling revelations for the diligent searcher into the records of the past.

But even though we may doubt that competitive examination is the cause of the continued duration of the nation, there can be but little question that the three doctrines already enunciated must have contributed to it in a large degree, even if they are not, as I am inclined to think they are, the sole cause of it. Nor can it be questioned that the system of competitive examination assists materially to maintain the work prescribed by these doctrines.

Mr. Meadows observes:—

“The desire of raising himself above his fellow-creatures is one of the strongest passions of man’s nature; hence if even a probability of advancement is held out to him as soon as he shall be worthy of it, his exertions are immediately increased; while if the certainty be there, it is no exaggeration to say that they are doubled and trebled.”

It is this desire of distinguishing himself that is the passion acted on systematically by the Chinese polity.

In China the only posts of distinction are those of Government servants. The only road to them is by competitive examination, and the literary graduate, even though he only be an expectant for official service, and however poor he may be, is much more respected, and really possesses a greater practical influence, than the rich but unlearned merchant or landed proprietor; and thus does the State secure the services of the wisest and ablest men, and hence the only class that has to be repressed by the Government officials is nearly entirely composed of men of mean ability.

Having thus, in as few words as possible, stated what may be the cause of the long stability of the Chinese nation, a question at once presents itself to us, and one by no means easy of solution.

For those who have studied Chinese history, and have traced backwards the line of dynasties through the dim twilight of the earliest records till they have at length lost them in the darkness of fabled antiquity; those who have marvelled at the gigantic works and the advanced knowledge of the Chinese of long ago, who have been startled by the fact that a reference to the culmination of stars shows that the Chinese historical classic must have been written at least 4,000 years since, and who have been dazzled with the splendour of some epochs in Chinese history, cannot fail to be lost in sorrowful amazement at the stagnation of the last few centuries, and to ask

themselves what it is that has arrested in its growth the civilization of this wondrous people.

It may seem rash to attempt a reply to such a question, but as the prospects of the future depend upon it, and as each new theory may contain some grain of truth, I venture to give my opinion. And I think that this very system of competitive examination, although it has tended to perpetuate the nation, has nevertheless tended to perpetuate it in an unchanging condition, and has materially contributed to the stagnation which forces itself upon our attention as one of the most marvellous facts of history.

There is now no time to discuss this matter, but I would briefly point out, in the first place, that the subjects of these examinations are not such as to produce originality of ideas, but that they rather tend to force the whole national mind into one groove of thought, and that a very narrow one.

Thus, without originality and devoid as the Chinese are of imagination, it is not difficult to understand why they should have ceased to advance.

Further, the very fact that all the talent of the country is absorbed in the service of the State must tend to hinder the advancement of the nation. For even in progressive countries a system which would divert from private enterprise all those who help to make the country great would have lamentable results. How much more must this be the case in one where enterprise of any kind is almost unknown, and which has, as it were, been asleep for centuries? In Western States, honour, fame, and dignities attend those who succeed, no matter in what walk of life; but in China none but the officials can hope for any of these. If we look back at the history of our civilization, we find that all the great strides in science, and nearly all the greatest works of literature and art have been due to private individuals. The discovery of America, the establishment of the overland route to India by Waghorn, the Suez Canal, and newspaper correspondence are but a few instances; and in this country does not the Government always look with suspicion on any measure that would appear likely to interfere with or retard individual effort?

It may seem that I have been somewhat deviating from my subject; but I think it will be admitted that the considerations into which I have entered were necessary for the due prosecution of the great inquiry, How far is China likely to take her place in the future in the rank of great military nations?

This inquiry naturally divides itself into the questions:--

1. What material is there in China for making soldiers?
2. What for the production of Officers? And
3. Without altering the fundamental principles of Chinese polity, what changes in the details of the system are necessary to raise from the Chinese people the Generals and subordinate Officers necessary?

The answer to the question, What material is there in China for making good private soldiers? is easy.

The Chinese, especially those of the north, are a fine people physically: they are hardy and enduring, frugal and temperate; they can

undergo great fatigues on a small amount of food, and will support great privations without complaint. They are law-abiding, docile and obedient to authority; and if the discipline in their armies is at present lax, the history of Gordon's force shows us what it might be if the soldiers were properly paid, properly officered, and properly looked after.

In his history of the "Ever Victorious Army," the author writes:—

"Sometimes a regiment would be a whole month without anyone in it deserving punishment, and the relationship between the men and the Officers was on the whole affectionate. The Chinese were, as a rule, very orderly; and as drunkenness was unknown amongst them, the services of the Provost-Marshal rarely came into use, except after a capture, when the desire to loot was a temptation to absence from the ranks."

The other qualification requisite for a soldier is courage; and although I would at the outset state that, owing to his education and surroundings, I do not believe that the Chinese possess any heroic feeling of devotion, yet I think there can be no reason for the assumption that has been made that they are a cowardly race.

I think, on the contrary, with Mr. Meadows, that:—

"The Chinese possess as much of constitutional or animal courage as any other specimens of the human race, but of that courage which is based on a determination of the mind to display intrepidity, they are nationally wanting, simply because their own opinions and institutions offer little inducement to their minds to come to any such determination."¹

In England we are taught to regard bravery and warlike talents as among the highest of human qualities. In China, on the contrary, the national education tends rather to reduce the military virtues to a low place.

There was, no doubt, at one time, a prevalent belief in the West that the Chinese were a cowardly people, and the ease with which English troops beat Chinese after a mere show of resistance has been adduced as a proof of it.

A little consideration, however, will show the error of the assumption.

The English were armed with weapons that they knew were infinitely superior to those of the Chinese—they had been brought up to look upon military valour as a very high virtue—they knew that disgrace followed cowardice, and that, at least, honour was the reward of valour. They knew that there were pensions for themselves if disabled, and for their widows in case of death; above all, they had confidence in the skill of their leaders and the courage of their Officers.

To the Chinese, on the other hand, all these incentives were wanting. They not only knew that the foreign arms were deadly, but they had the most exaggerated ideas of their power and effects. They had passed their lives in a society where military virtues were regarded as of little moment, and where military Officers were looked upon with little better than contempt. With them a panic, and even a headlong flight,

¹ "Desultory Notes." By T. T. Meadows.

by no means brought disgrace, and they were well aware that the highest courage would meet with little, if any, reward. They were miserably paid, often not paid at all, and pensions are quite unknown. Finally, they had every reason to know that their Generals were incompetent, and no reason to suppose their Officers were animated by any higher spirit than themselves.

Under these circumstances, is it reasonable to accuse the Chinese of want of courage, because they did not offer more serious resistance to our troops?

There are, moreover, instances on record that fully corroborate what I have stated.

Wilson, in his "Ever Victorious Army," states that—

"As sappers, the Chinese are equal to any Europeans. They work well, are quite cool, from their apathetic nature; and however great their losses, do not become restless under fire, like Europeans."

It is universally acknowledged that, even with the best disciplined soldiers, it is a mark of the highest training when troops can be brought to assault a second time immediately after a repulse; but at the siege of Tai-Tsan, after the storming party had already once been driven from the breach, it was assaulted a second time within half an hour, and carried; and at Kin-Tang, three successive assaults were made which were desperately resisted by the rebels.

Another instance is quoted by the same author, who writes:—

"Four rebel horsemen rode past the steamer in a shower of bullets, and when one of them was struck off his steed, the others waited for him and carried him off—a fine instance of Chinese courage and fidelity."

Instances could be multiplied to an almost unlimited extent, and the opinion of many other thinking men might be brought forward. But I believe that I have said enough to show that the Chinese, if properly trained, properly armed, and properly led, by Officers in whom they placed confidence, would certainly furnish material for admirable soldiers.

But, on the other hand, it is my opinion that, for two very sufficient reasons, the Chinese will not make good Officers.

The first is, that the Chinese are, as a nation, entirely without observation and altogether devoid of originality. A Chinaman can learn anything, but he can conceive nothing; he may readily be taught any number of the most complicated military manoeuvres; but place him in a position slightly different from that in which he has learnt, and he will be found incapable of conceiving any modification to suit the altered circumstances.

Prompt action, readiness of resource, ability to seize on the smallest advantage, or to neutralize a misfortune; these are the qualities that make a soldier, and these are the qualities that cannot coexist with the Chinese want of originality.

The other reason is that to which I have already alluded, the national want of that courage which is based on a determination of the mind to display intrepidity—the national want of any feeling akin to self-sacrifice in the cause of duty.

If we look at the history of the world, we shall find that two mighty influences have been at work to induce such a feeling as that of self-sacrifice—the first has been religion, and the second the desire so strongly implanted in the human breast of gaining the esteem of fellow-man. Indeed, I doubt if I shall be guilty of exaggeration, if I assert that all great, virtuous, and noble actions have been prompted by one or the other.

When, therefore, we bear in mind that at all events, so far as military virtues are concerned, both of these influences are completely wanting to a Chinaman, we must be driven to the conclusion that we shall not find these military virtues in China. This leads us to the conclusion of the paper, the considerations of the future possibilities; and as I have already pointed out, what are in my humble estimation the wants in the Chinese system, I have to a certain extent indicated the remedies; and these would be—

First, the admission of military men to positions of honour and esteem at present only open to civilian literati.

Secondly, an alteration in the subjects of the competitive examinations.

With regard to the first, I will quote the words of Mandeville, who, in writing of the Romans, said:—

“But if we would know what made them excel in fortitude, courage, and magnanimity, we must cast our eyes on the pomp of their triumphs, the magnificence of their monuments and arches; their trophies, statues, and inscriptions, the variety of their military crowns, their honors decreed to the dead, public encomiums on the living, and other imaginary rewards they bestowed on men of merit; and we shall find that what carried so many of them to the utmost pitch of self-denial, was nothing but their policy of making use of the most effectual means that human pride could be flattered with.”

With regard to the second, however, it is held by some whose opinions are entitled to the highest respect, that from the very fact that the subjects of the examinations have been for centuries the revered ancient books, and these alone, so the national mind has been moulded in uniformity; that it is owing to this and this alone that the same ideas have pervaded the whole Chinese nation; that it is this that has produced the marked individuality of the race, and has allowed it to remain homogeneous and united amid the rise and fall of so many Empires.

I have little doubt that if the exact sciences were introduced into the Chinese curriculum, in course of time originality would be developed, and China might produce a Tyndall or a Newton. It is to be believed that if the military examinations were something better than the childish exercises now in vogue, a race of Officers might appear worthy of a great nation; but then the momentous question arises—a question that must ere now have presented itself with terrible force to some minds in China—What would be the effect of scientific education and its necessary concomitant free thought; would it be possible any longer to keep 300,000,000 of people united; would not the spirit of change or revolution be let loose, and, bursting

the floodgates that so long had held it back, sweep away the landmarks of centuries, tear up the roots of existing institutions, and leave China even as Assyria, Egypt, and Babylon, a mystery to future generations?

The CHAIRMAN: We have had a very interesting paper on the subject that Captain Gill has brought before us. We ought to have had Colonel Gordon, the Commander of the "ever victorious army," here, who certainly knows more on this subject than anyone else can possibly do, who has seen the Chinese first in their ragged state, and afterwards succeeded in welding them into a force very much like the Duke of Wellington's Peninsular Army, who could "go anywhere and do anything." I hope that there are some gentlemen here who can give us some information on this subject. The main question raised by Captain Gill is how far it is possible, given an unlimited number of men, with many of the best qualities of endurance, hardihood, and temperance, and given arms of precision, can you make an army out of them, because if you can, you have got all those first elements in the Chinese Empire, and they have now got arms of the best quality? The question is whether, by a better system of education for the native Officers, and by employing foreign Officers to drill and instruct them, they could not be welded into a great army. That is a question upon which I should hope some soldiers here, who have been in contact with Asiatic races, may give us some information.

Mr. DEMETRIUS BOULGER: There are two points mentioned by the lecturer upon which I should like to say a few words. The first is this:—Captain Gill seems to me to sketch the future of the Chinese Army only if the Chinese are willing to accept foreign Officers, in order to raise their native army to a high state of perfection. I venture to think that there is very little evidence in favour of the view that the Chinese are willing to make more than a temporary use of foreign Officers. The great point in the Chinese policy is to depend upon themselves, and I think it would be nursing a fallacy to suppose that the Chinese will at any time accept foreign Officers as a permanent staff. They may, forced by some necessity that may arise in consequence of foreign war, make a temporary use of foreign Officers or foreign superintendents, as they are at the present moment at their great arsenal at Kiang-nan, but, as soon as they have served their purpose for the moment, they will try and get rid of them. The secret of the Chinese policy is dependence upon themselves, and, as soon as they have raised their army to a certain, though a very imperfect, state of efficiency, they will be content rather than strive to attain a higher state by the aid of foreign Officers. Another point I would wish to touch upon is this. Captain Gill seems to think it is hopeless to expect from the Chinese any originality. Now, I think the past history of China shows they have very often, before even they had any assistance at all from foreigners, produced great Generals. Anyone who has read the campaigns of one hundred and fifty years ago will admit that Feyanku, who was Kang Hi's General; that Chowmodo, who appeared like a Heaven-sent champion when the Chinese were at the last stage of distress in Central Asia, and defeated Amursana, and also General Fouté, who marched not only across the Desert of Gobi, but across the Pamir and defeated, in two battles, the Kashgar Prince on the crest of the Pamir, on the borders of Badakshan, were all great Generals. These cases show that the Chinese have produced Generals in the past, who showed originality and power of conception; and, therefore, the Chinese are, to some extent, justified in believing that, as they possessed these native Officers and Generals in the past, they may in the future have the same. It is very important to call attention to the manufacture of weapons at the Kiang-nan Arsenal. It is not generally known that, at that arsenal last year, they produced twenty 40-pounder Armstrong guns, which were tested by European engineers, who said they were as good as if they had been turned out at Elswick or Woolwich. They have also turned out 7-inch 150-pounders, which have stood the same test, and my information states that those guns, made on the pattern of Armstrong's, have been sent on active service.

The CHAIRMAN: I would venture to offer a few remarks on the subject generally, having spent a great many years in China, and had some opportunity of seeing the Chinese soldiers both in war and in peace. For more than twelve months there was

an Imperial Army surrounding Shanghai, while the insurgents held possession of the city, and there was a great deal of fighting going on. Indeed, once or twice I had to take an active part, with some of our blue-jackets and marines, in attacking one of their fortified camps. I have always been struck by the pluck they showed in fighting at all, under the conditions in which they were placed. At that time they were badly armed, they were clothed in a sort of Falstaff uniform, and they were often deficient in rations. They were always in arrear of pay, and, if wounded, they had no hope of surgical aid to save their limbs, no hospitals for treatment, nor of any pension afterwards. Now, a man must have the combative instinct in him to fight at all under such conditions, especially as they are deficient, to a great extent, in what we know as patriotism. The Empire is so vast, with an area of some 4,000,000 square miles, and a coast line of over 3,000 miles, while its eighteen provinces really represent almost so many different countries, with diversity of languages and interests, so that, as we continually experienced in our own wars with the Empire, it was nothing uncommon for war to be going on in one province while in another they were dealing with us in the most peaceful way in the world, both authorities and people, even when our armies were marching on Peking! So that, taking away those conditions which generally lead men to fight—love of distinction and love of country, with the certainty that they will be duly cared for, if wounded, and rewarded, if successful—abstracting, I say, those conditions, it is a marvel to me that they fight at all. But, as they do fight, it is quite certain that they have the great qualities of animal courage and contempt of danger, and it is unfair, therefore, to speak or think of them as being cowardly. They only require to be well led, but when you have a body of not very well disciplined men, and their Officers get behind some ruins, as I have seen, and tell the men to "go on," instead of following their lead, you cannot expect much from them. We all know, in our own Army the Officers say "Come on!" which makes all the difference. I believe, as Colonel Gordon proved, that well and courageously led, licked into some sort of shape under discipline, and with good arms, it would be easy enough, in the course of a single year, to make them into a very formidable army, even to Europeans. They have taken two necessary steps at present. They have acquired a certain amount of drill and instruction, and they have arms. I believe the greater part of the real fighting army is in possession of the best arms of precision that are made, and if they had only Officers capable and were well disciplined, they would become formidable against any enemy. But what Mr. Boulger said is exceedingly true, that the jealousy of the foreign element is so great, and their desire to be independent and to develop for themselves whatever is likely to be beneficial is so strong, that they are continually changing their Officers, and they never will keep them long enough or give them sufficient authority and influence over their men, to make them into regiments. It is not enough merely to drill men, but their Officers must have a certain continuous influence over them; it is that which makes them into soldiers and an army fit for service. So long, however, as they go on in their present half-hearted fashion, they may spend enormous sums of money, as they have done already, and to very little result. I have seen the growth, in ten years, of dockyards and arsenals, at Tientsin and elsewhere, founded on the plan of our own, and when I was there last, I found some of the best Woolwich workmen had been induced to come over to them. They, with such help, can turn out arms and ships, but if they go no further than that, their money is almost thrown away, and if they are to come into contact with Russia, notwithstanding all their pluck, they can have no fair chance. To make a soldier you must have something more than arms and uniform; you must *make* him a soldier, and that can only be done by good Officers and constant discipline and drill. As to the Central Asian question, the Chinese are confronting Russia, and are very much bent on defending what is the great gateway into their western provinces. The Kiayu Pass, which is at the extremity of the Great Wall, leads by the shortest route across the Desert of Gobi, to Kuldja and to Yarkand, and it has been, from time immemorial, the traditional line of communication and traffic between China and Central and Western Asia. All the commerce and traffic which has ever taken place between them, has gone in that direction. It is also their weakest point, because it opens through all the wealthy provinces on the west, and they have always watched the frontiers and pass with considerable

vigilance under the present Manchu dynasty. There is no doubt, I think, that they regard the approach of Russia in that direction, and the desire which the latter have shown to hold a part of the province of Ili, that once belonged to China, and more especially the town and district of Kuldja, as a danger, if not a standing menace, to occupy in strength this road, which leads into their western provinces. But I think it probable that, with their usual tenacity of purpose and a General like Tso-Tsung-Tang, who has certainly proved that he has considerable military ability and power of leading his troops, they will prove unpleasant neighbours to the Russians in Turkestan, unless the latter can come to some diplomatic compromise. Feeling thus, I have no doubt there will be some collision between the Russians and Chinese; but there is this to be considered, that the defeat of a Chinese Army is no great matter to the Government at Peking; men are abundant, and they will get more armies; and distance is no impediment, because they march enormous distances. In all their history they have always shown that thousands of miles do not stop them. But with Russia, a defeat is a loss of prestige, a loss of power, that would be attended with serious consequences. This therefore a little re-dresses the balance and tends to lessen the disparity between the forces at the disposal of each. China can afford to lose army after army, or to incur defeats one after the other, without its shaking the Chinese throne, and such reverses would not in the least modify their determination to hold their own. But if Russia engages in a war at that distant point from her centres and her base of operations on the Caspian, of course a single defeat might have very serious consequences. I am sure you will allow me to thank Captain Gill, in your name, for the very valuable information he has given us on the Army of China, which, in the present aspect of affairs, has indeed a special interest.

Captain GILL: I should like to say a word or two with regard to what Mr. Boulger has said. I quite agree with him in thinking that the Chinese will never accept foreign Officers in their army as a permanent arrangement. I think it is a very great question whether any nation could hope to raise itself amongst military Powers which is dependent upon foreign resources for its Officers. I did not mean in the least to insinuate that the Chinese would ever take foreign Officers as a permanent part of their body politic. As to originality, I must say, from my own experience of the Chinese, that I consider that originality is a thing that is almost non-existent in the Chinese nature. I do not believe that, under the present system of examination, which so narrows their minds, any really original genius would ever arise, or that with that system they would ever be able to provide efficient and good Officers and make an army, as we understand it. Of course it is possible that there are instances on record of considerable military skill having been shown by their Generals on many occasions. At the same time I must say that I adhere to my own opinion that there is a great want of originality in the Chinese, which will prevent them from being a great military nation.

Friday, May 7, 1880.

LIEUTENANT-GENERAL C. P. BEAUCHAMP WALKER, C.B., &c., &c.,
Vice-Chairman of the Council, in the Chair.

MODERN FIRE: ITS INFLUENCE ON ARMAMENT,
TRAINING, AND TACTICS.

By Captain WALTER H. JAMES, R.E.

GENERAL BEAUCHAMP WALKER and Gentlemen—Before entering on my lecture, it will be well to explain what I mean by "Modern Fire." I would, therefore, beg to draw your attention to the fact that, in no war yet fought, have we seen the fire from artillery and small arms such as we shall see it in the next struggle between any two European Powers. In the Franco-German War, the guns on both sides and the rifle on one side were much inferior to more modern arms. In the Russo-Turkish War the Turks, indeed, possessed weapons which, so far as regards the armament of the infantry, were equal to what we now see in the best-armed nations of the Continent, but their artillery possessed no efficient shrapnel shell, and besides which the training of the Turkish Army was so bad, that we may fairly assume that the effect they got out of their weapons does not represent what a well-trained European Army would have obtained from them.

Nevertheless, the late wars teach us two important lessons, lessons which have been taken deeply to heart by all European military leaders, viz.:

1. The value of long-range infantry fire, by which alone the true advantages of the modern rifle are gained;
2. The necessity for increased power and accuracy in our guns, and the need of a powerful shrapnel.

In the next war, then, we shall see the systematic use of wide-sweeping infantry fire, from weapons which are practically equal in the field of battle, and which are greatly superior to those hitherto employed, with one exception, the Peabody-Henry, by any nation. We shall find, also, powerful and long-ranging guns, employing chiefly shrapnel shell, the man-killing power of which will be far in excess of anything yet seen in action in the shape of artillery. Just imagine, for an instant, what the fire of a hundred guns, firing such shells, will be. The firing of the two hundred and odd guns concentrated against St. Privat would be nothing to it. It would be more nearly represented by the effect of the old small-bore guns firing case, the terrible effects of which were clearly shown in the well-known instance of Friedland. Infantry fire we shall find employed up to ranges of 2,000 yards, against suitable objects, while shrapnel fire will be

efficacious at 3,000 yards, and common shell up to 4,000 yards. Admitting these facts, which are universally acknowledged on the Continent, we have now to see whether our own armaments are such as they should be to meet the requirements of the case. So far as our rifle is concerned, we have in the Martini-Henry the best weapon as yet introduced into any army. Its only drawback is the Boxer cartridge; but, if a solid-drawn case were introduced, as I assert it may be without any alteration of the weapon, we shall be in possession of the best military weapon yet introduced into any army.¹ Of our field-guns, I regret that I am unable to speak so highly, and a comparison with those of other Powers, given in Table A, will show that we are considerably behindhand.

I must, however, for a time, quit the question of armament, to refer to the all-important question of tactics with which the choice of suitable weapons is so much bound up.

I have said that the modern battle-field will be more or less under bullet fire from rifles and shrapnel shell, up to a range of 3,000 yards. It will, therefore, always be the object of troops on the defensive to select open ground, which they can sweep with their fire, and thus inflict the greatest possible loss on their assailants. This in turn necessitates the use of such formations by the latter as will, while affording them the maximum power of reply, *i.e.*, by fire, offer as little target as possible to the enemy. In other words, "open order" is a necessary condition of modern fighting. Now, "open order" is essentially opposed to the use of the bayonet—to the attack by shock. For shock tactics postulate the employment of bodies in which the individual impulse is given up and the impulse of the commander substituted for it, as in the battalion line or heavy column, both of which formations are now inadmissible on the battle-field. It follows therefore that, as everyone knows, we see in modern wars no attempts to push the enemy out of the position he holds; but the attacking force tries, by bringing a superiority of fire to bear on the defenders, to induce that state of feeling among them which the close approach of the former finally turns into flight. As Boguslawski has well put it: "*Wenn du gehst nicht weg dann geht der Feind weg.*" Admitting this, we see that the keystone of our tactical training must be the highest possible development of the fire-power of our troops.

Now, the deadliness of fire can be increased in two ways, *viz.*, by increasing the flatness of the trajectory of the rifle and by increasing the number of bullets poured on a certain spot. The number of bullets fired at a given object may be increased either by firing at longer ranges than have hitherto been employed, or by firing more often within what have hitherto been considered proper ranges. The former of these objects is gained by long-range infantry fire, the latter by the use of repeating rifles or other means of increasing rapidity of fire. This, it will be observed, is quite a new way of

¹ To use the Boxer cartridge in the Martini-Henry rifle, the bullet-chamber has to be made slightly larger than is necessary to use the solid drawn case. To use the latter, therefore, with our present rifles, it would be necessary either to make the case thicker, or to use a paper lining to make up the difference.

looking at the question of rifle fire. Formerly we were taught that beyond 600 or 700 yards, fire was thrown away, because the individual soldier's chance of hitting an opponent was small beyond those ranges. But since then, the bloody fields round St. Privat and Plevna have taught the lesson that it is the mass-fire of troops, and not that of individuals, that is to be dreaded. Once this is admitted, it follows that the oftener men fire, the more deadly will the result be, and hence long-range infantry fire, which is the natural expression of the fact that, although at long ranges one man may not hit the man he fires at, still he may hit another, and that, when a certain number of men fire at a given object, some are perfectly sure to hit the mark.

Now, it is obvious that, if we are in some cases to open fire at 1,500 yards instead of 500 yards, we shall expend more ammunition. This, in its turn, involves two points, the one, the amount of ammunition that should be carried by the individual soldier, and, secondly, the means we must adopt for supplying him with it.

With regard to the number of rounds to be carried by each man, the numbers carried at present by European soldiers are:—

				Total.
England—on the soldier..	70;	in the regimental reserve..	30..	100
Germany	.. 80;	..	..	37..117
France	.. 74;	..	..	18.. 92
Austria	.. 84;	..	..	35..119
Russia	.. 60;	..	..	60..120

But looking to the experience of the Russo-Turkish War, it is fairly open to doubt whether any of these are sufficient. Indeed, most Russian military writers say, that each man should have 90 to 120 rounds, and that a regimental reserve making the total up to about 180 is necessary. I believe, myself, that it would be well to give each man 100 rounds, and to have a regimental reserve of 50.¹ This reserve should be carried as follows:—40 rounds per man, or say, 66 boxes of 600 rounds each in a six-horsed wagon, abolishing the present carts, which are too heavy to get over rough ground, and quite unsuited for the supply of cartridges to the fighting line. This must be done by a combined system of bāt-horses and carriers provided with haversacks such as are now employed. Each company should have one bāt-horse carrying 10 rounds per man, *i.e.*, two boxes of 600 rounds each. The experience of the Russo-Turkish War shows that horses may be used comparatively close up to the fighting line without much loss. The present type of ammunition box must be altered so as to open with greater facility, and if possible it should be made lighter.

Having dealt with the question of the ammunition supply, I propose briefly to lay down how long-range infantry fire should be employed. Put broadly, every fighting formation now-a-days consists of a shooting line with supports. The former does the firing, *i.e.*, the fighting, and the latter has for its mission the filling up of gaps in it. Again, the fighting line may be said to consist of a certain number of fighting units, *i.e.*, the number of men which an Officer can control in extended order.

¹ Insandhlwana has clearly shown the desirability of an increased supply.

Now we have seen that at ranges beyond which the ordinary shot may be expected to hit his man, the effect of fire is due to the probability of a certain proportion of the bullets fired at a given object taking effect. It follows, therefore, that fire delivered at anything over 600 or 700 yards should not be independent, but should be delivered only at the command of the fighting unit leaders, in other words, volleys must be used. Time will not allow me to discuss in detail any particular fighting formation, nor do I think that much is to be got from any attempt to tie men down rigidly to one form. Such restraining bonds are very apt to fail altogether in the heat of action. It would, however, seem to me that great stress, whether on the offensive or defensive, should be laid on the necessity of keeping intact as much as possible the fighting units. The experience of the last two wars has shown over and over again that men move forward now not by the order of a commander, as in the old times when a battalion acted as a whole under the direction of the Colonel, but under the impulse of individual Officers. It follows, therefore, that the Officers having to lead and not direct the fighting line, the latter has a tendency to become a series of fractions, each led by an Officer. In order that these fractions, fighting units as I have called them, may be properly under control, their size must be such that they can be led by an Officer. In the hurry and heat of combat it is impossible for an Officer thoroughly to control more than a space of about 40 yards, *i.e.*, about 20 yards on each side of him. At one man to a yard this gives 40 men as the command of an individual Officer. For purposes of discipline any number of these may be taken to make a company, and any number of companies may be taken to make the battalion. But once under fire, it is the fighting unit or section, call it what you will, that becomes the *unit par excellence*, and upon the proper manipulation of which good tactical results must depend. I have said that these units should be kept as far as possible separate, and it would appear, therefore, that in our initial formation, whatever that may be, a space should be left between them. For otherwise what happens? Instead of a line of fractions each under the control of a leader, we get what is after all but the old line formation with intervals between individual men. Now no such line can advance for a long distance, say 2,000 yards, such as it has to in modern fighting, without crowding and confusion. Intervals must be kept, therefore, as long as possible to prevent this. Moreover by keeping the units separate we enable a better control to be kept over their fire. Volleys are necessary for this purpose, and volleys cannot be kept up, if no one knows under what Officer's command he is, and this he cannot tell, if he forms one of a long line instead of one of a small unit. Admitting what I have said, our initial formation for attack should be a line of such units with intervals between them as shown in Fig. 1, Pl. X. The supports would form a second line to feed the first. The reserve would be used as at present, to feed the fighting line, to prolong it, to ward off a flank attack, or to outflank an enemy. When within about 600 or 700 yards of the enemy, the shooting line may be reinforced to its full strength of a man per yard, and recourse may be had to independent

firing. The supports should, I believe, fill in the gaps between the fighting units, so that companies should be kept as intact as possible; and it must be remembered that the shrinkage from the loss which will necessarily have taken place in the fighting line will greatly facilitate this. Latitudo to the leaders is, however, absolutely necessary. It must be the object of those in the fighting line to develop the fire as much as possible, those in rear must think only of the duty of supporting the front, of keeping up its *morale* by fresh men, and of seeing that ammunition is brought up. The front line itself may advance according to circumstances by rush of alternate companies, or by alternate ranks, or by what I call Sir John Moore's plan, namely, to rush for an indicated point or object in front, such as a hedge or ditch or hollow in the ground. One thing I believe, however, is a necessity arising from the fearful intensity of modern fire, *i.e.*, that when once close ranges, say, 300 or 400 yards, are reached, men must advance firing. For whatever other system is adopted, the fire of half the line must be stopped while the other half is advancing, thus offering a favourable opportunity to the enemy. Circumstances will often allow of the supports or reserves firing over the heads of the shooting line at long ranges, especially early in the action; whenever this can be done with safety, it should be, provided a proper object offers. Especially will it be advantageous to the defence when a double or perhaps triple line of fire can be adopted. It will, as a rule, be better to do so than to depend much on reinforcing the front shooting line. For to be free from heavy loss, which demoralizes men unable to return fire, it would be necessary to keep supports under shelter, which, unless the ground is very exceptional, can only be done in deep trenches which require time to execute; and even then they must pass over the fire-swept space which divides them from the shooting line. It will therefore, as a rule, be better to have two fire lines made up to full strength from the beginning, to use them simply as fire lines, not replacing losses, the duty of offensive returns being undertaken by special reserves kept under cover. One word on a matter of detail with regard to volleys. I think the word of command, "Fire," should be re-introduced. All foreign nations use it, and I believe a better effect could be got from the men, who would then only pay attention to their sighting, instead of as is now so often the case, giving their whole attention to the man on the right, so as to ensure delivering the volley together.

One result of the increased employment of fire in modern war is the greatly enhanced value of artificial cover. We find that in the late war, the Russian soldiers threw up shelter whenever the Turkish fire brought them to a standstill, and that so thoroughly was the necessity for this admitted, that the men of Skobelev's division carried in their advance from Plevna to Constantinople ordinary intrenching tools on their backs. It is now universally admitted that intrenching tools must be carried by the men. In Table B is shown how this problem has been solved on the Continent. It seems to me that every infantry soldier should carry a spade, and I think that the form I have before me (Fig. 2), which weighs only 2 lbs., is about the

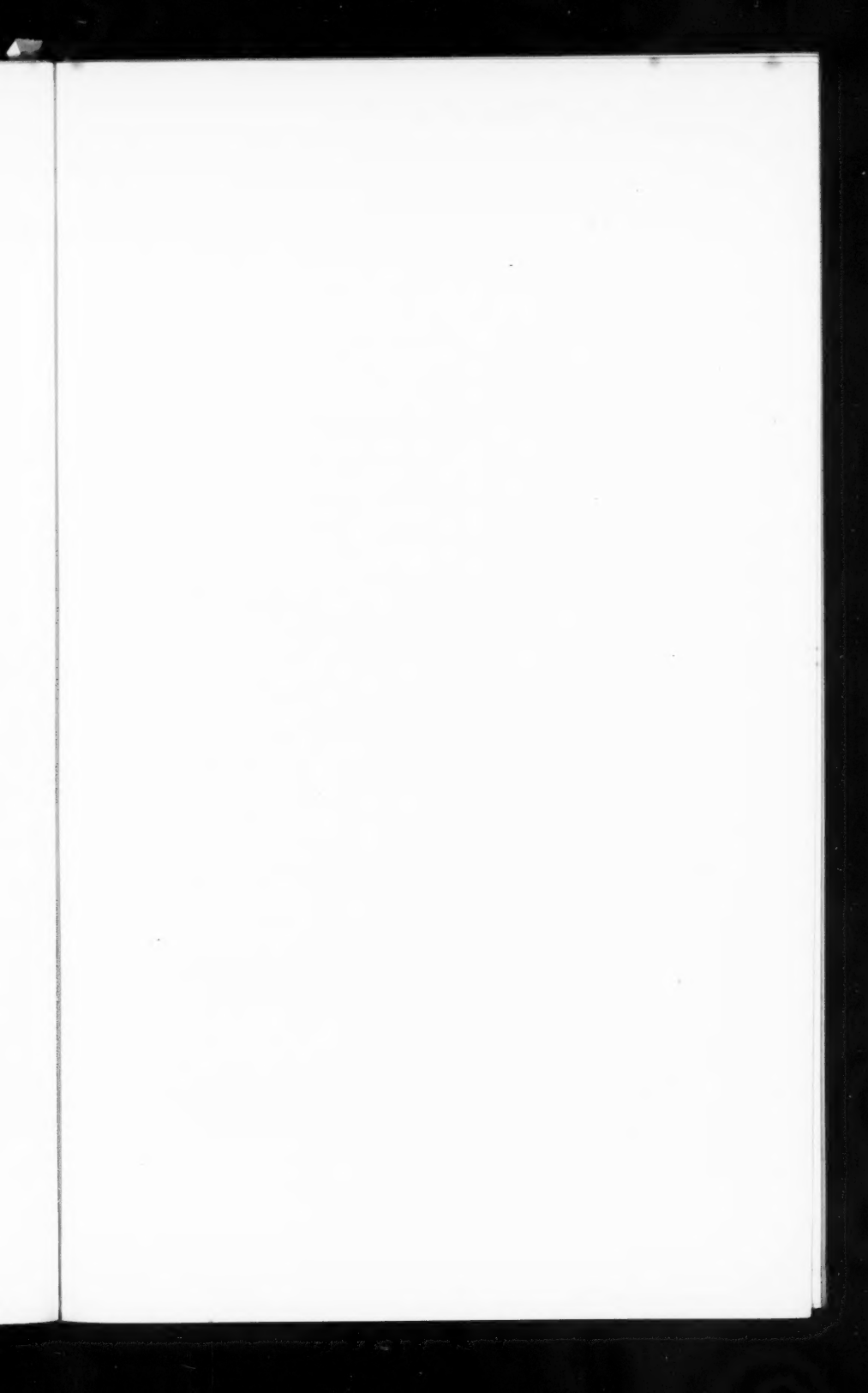


FIG. 1.



Fighting line, shewing division into units.

FIG. 2.

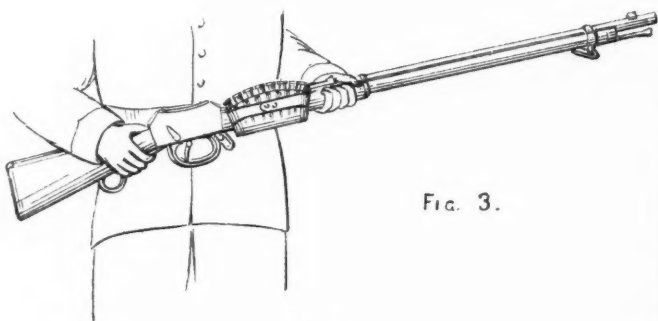
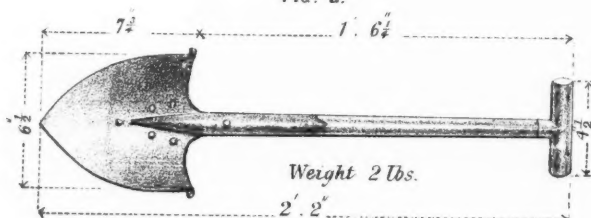


FIG. 3.

FIG. 4.



FIG. 5. A.

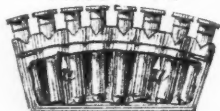


FIG. 6. B.

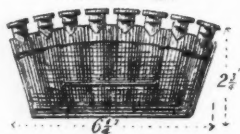


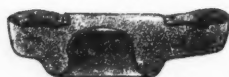
FIG. 7.



FIG. 9.



FIG. 8.



best yet devised. From experiments made it would seem that in all ordinary ground, cover can be got with it as quickly as with the small field service shovel. It is proposed to carry this tool in the bayonet frog behind the bayonet. It would also in my opinion be desirable to substitute for the ordinary bayonet, the pattern proposed by Lord Elcho. The latter can be used as a chopper or a saw, the former is of no use but as a pike.

We have then come to the conclusion that the soldier must carry more ammunition, and also a tool. But unfortunately there is a limit to the weight we can impose on him, and if he must have these additional weights to carry, something must be taken off in other directions. I venture to propose, therefore, that a soldier should be expected to carry only his rifle, bayonet, ammunition, intrenching tool, great coat, waterproof sheet, canteen, water-bottle, three days' iron rations, his forage cap and a clasp knife, in short, weapons with ammunition, food, cooking pot, and covering for the night. Everything else should be carried for him.

A battalion organized as I propose, would have—

8 company	4-horse wagons;
1 ammunition	6 "
3 Quartermaster's	4 "
1 Head-Quarter	4 "
8 bat ammunition	horses.

Each company wagon would contain the kits of the men, a few of the larger intrenching tools, 1,200 rounds of ammunition, if necessary, preserved provisions for one day, and the usual stores and Officers' baggage, making up a total weight of about 19 cwt. Should the Oliver equipment be introduced, it would permit of my plan being easily carried out. The kit-bags would go in the wagons and the soldier would carry the rest. Nothing is of greater importance than to increase the mobility of the soldier. The army that can march fastest wins most battles, as history has shown us over and over again. My proposition would render each company independent and reduce the load carried by the men, thus greatly adding to their marching powers. The proposed arrangement is shown in Table C.

I now come to the question of the armament of our infantry. I have said that, putting aside the cartridge, the Martini-Henry is the best military weapon yet introduced into any army; but a much better arm could, with our present knowledge, be produced, and, as we have nothing like an adequate supply of rifles for our forces, there is no insuperable objection to the introduction of a new pattern. The rifle of the future will, in my opinion, be about .38 inch bore, and fire a bullet weighing 380 grains with a charge of 100 grains of powder. Such a weapon would be as accurate as the Martini-Henry at long ranges, and having a muzzle velocity of about 1,600 feet, would give a much flatter trajectory at short ones, which is a very great advantage. The weight of the cartridges too would be less, twelve of them weighing about the same as ten of the present Martini-Henry Boxer cartridges. I have less hesitation in proposing an alteration in calibre of the

infantry arm since the future undoubtedly lies with repeating rifles. The advantage of this form of weapon is that it enables a sudden shower of bullets to be poured in at a moment when increased intensity of fire will decide the victory. There comes a moment in every fight when one side or the other begins to feel, in homely parlance, that it has had enough of it. At such a moment the effect of a sudden increase in the intensity of fire, such as the repeating rifle gives, will decide the result. Moreover, for use on picquet or sentry duties, as a valuable means of lessening the danger of surprise, the advantages of the repeater are undoubted. I may remind you that Switzerland has for some years had her infantry armed with such weapons, while the Turkish cavalry employed the Winchester in the late war; that they are being introduced into the French and Norwegian navies; and that numerous experiments in this direction have been made by other foreign Powers. I have here, by the kindness of the Director-General of Artillery, two types, viz., the Hotchkiss and the Kropatchek, the latter of which has been adopted by the French Navy, and is highly thought of in Austria. It holds six cartridges in its magazine below the barrel, one in the elevator, and one in the rifle, or eight altogether. The Hotchkiss contains five cartridges in the butt, which arrangement I prefer as giving a better balance. I have here, however, an invention which seems to me may very possibly supersede the repeating rifle, the construction of which is necessarily more or less complicated. It is called the Krnka quick-loader, and is the invention of the well-known foreign inventor whose name it bears. It is intended to facilitate the loading operation of an ordinary weapon, and is fixed thus to the rifle (see Fig. 3), the soldier then having his cartridges near at hand, can load very much more quickly than when he has to take the cartridges from his pouch. The cartridges are, it will be seen, made up in specially constructed packets (see Figs. 5 and 6) which can be readily placed in the cartridge-case holder.¹ Of course, it will always be possible to fire the few cartridges contained in the magazine of a good repeater more quickly than the same number from an ordinary breech-loader, but this advantage disappears if the fire be kept up longer, as Table D shows. This apparatus has been adopted by the Russian military authorities.

To sum up the question of armament. It would seem to me necessary to introduce either a repeating rifle or some such arrangement as the quick-loader, at the same time reducing the calibre, for the reasons I have given. Should the quick-loader prove, after experiment, to be on the whole better than a repeating rifle, I believe it would still be well

¹ To attach the quick-loader to the rifle, seize the latter in the left hand at the position of the "ready." Take the cartridge-case holder (Figs. 7 and 8) in the right hand, clip (*a*, Fig. 7) pointing to the left, apply it to the stock just below the lower band (*b*, Fig. 4), and then push it down towards the trigger-guard as far as it will go; then put a case of cartridges into the holder. When the cartridges have all been fired, pull out the empty case by the forefinger and thumb, and place a fresh case in, as before. Fig. 5 shows a packet of cartridges, with the side removed, to show the springs *a a*, which keep the cartridges in their place. Fig. 6 shows a packet of cartridges. Figs. 7, 8, and 9 show the clip.

to have a new rifle, to gain the advantages of the reduced calibre and to adopt a breech-loading apparatus better suited to the lying-down position than that of the Martini, which is very awkward to work in such an attitude. In the well-known Soper breech-loader we have, it seems to me, that which we seek.¹

But, Gentlemen, although new arms and new tactical forms are no doubt necessary for modern war, there is something more than these required to make our troops efficient. I mean "tactical training," the thorough teaching of our soldiers in what they have to do in war. The members of this Institution are familiar with "Extracts from 'an Infantry Captain's Journal,'" translated by Colonel East, and published in No. 89 of our Journal. Most of you, too, have doubtless read the "Tactical Examples" of Helvig, translated by Colonel Sir Lumley Graham. These works show what our Officers and soldiers must be taught. Mere barrack-square drill will not suffice; all ranks must practise in peace what they have to do in war, and until this is done thoroughly, no army can be called efficient. It is not only autumn manœuvres which deal with large masses that are necessary; it is far more needful to instruct the smaller units, such as companies, squadrons, batteries, in what they have to do. Remember that, while the former are expensive from the large tracts of ground necessary, there is no military station where tactical instruction, on a small scale, cannot be carried out. I would suggest that, in every military district, a set of small problems, dealing with outpost duties, attack and defence of certain localities, should be drawn up, so that the troops in the various stations may be properly trained in what I may call their war duties. Never let the attack formation be practised without men falling out to represent casualties, for otherwise an unreal state of things occurs when the shooting line is reinforced. Let it also be remembered that the firearm is now the soldiers' weapon, a weapon he may be called on any day to use, and therefore should be constantly practised with. I cannot help thinking, therefore, that we might with advantage practise the soldier more frequently in its use, and also increase the number of rounds allowed for the purpose. In Germany 130 rounds, in Austria and France 110 rounds, are allowed. We might take 122. Accepting my proposition, I think that abolishing volley, independent, and skirmishing firing, as at present practised, 40 rounds might be expended in four different practices of field-firing, of 10 rounds each. That once a month, for the eight best months of the year, 5 rounds should be fired by each man at the target, and that once a year a course of 42 rounds should be fired. The classification of the men to be determined from the results of these 42 rounds. I would at target practice allow any position to be employed.

Table E shows how I propose to employ the 122 rounds allowed.

¹ The special advantage of the Soper over the Martini-Henry rifle, in addition to its far greater rapidity (43 well-aimed shots have been fired from it in a minute), is that it can be much more easily loaded when lying down. The breech lever is on the side, and not underneath, so that it can be worked by a simple motion of the thumb. To load the Martini-Henry when lying down, the soldier must turn over partially on his left side.

With regard to the artillery part of the question, time only permits me briefly to allude to it.

The lessons of the last wars are—

- 1st. The necessity of concentration of fire;
- 2nd. The desirability of increasing the man-killing power of the projectiles, in order to cope more effectually with modern rifle fire;
- 3rd. The inefficiency of small common shells against earthworks.

The first of these is a question of tactical handling so universally admitted that I may at once dismiss it. With regard to the second, Germany, immediately after the war, set to work to remodel her artillery. This has been now completely done, and the improvements introduced comprise the following, viz.: Increase in power by the abolition of light field batteries, all German batteries, except the horse artillery, being armed with the 9-centimetre gun, firing a shell which weighs 15 lbs.; the introduction of a shrapnel shell; the improvement of the man-killing power of the common shell by the introduction of the double skin ring-shell, which ensures it breaking into a large number of fragments; lastly, the increase in velocity obtained by considerable increase in the powder-charge, which gives greater accuracy and range.

These various changes have been copied by Austria, France, Russia, and Italy. We alone stand at present behind the other great Powers, although doubtless we shall catch them up again in the course of time. With regard to the third point, the Russo-Turkish War showed the harmlessness of artillery fire from light field-guns against earthworks, and the new weapons, therefore, with which Russia has armed her field artillery, fire much heavier projectiles than those of any other nation. In the same direction, the French have provided their corps-artillery with two batteries of 95-centimetre guns, firing shell of 24 lbs. weight. I must, however, add that these have lately been withdrawn, although it is possible we may see, in a future war, a special artillery reserve armed with these guns.

Table A gives some of the most important data concerning European field-guns.

It is evident that the strides in advance that other Powers have made, will compel us to follow suit. The 13-pounder gun now in course of experiment is an improvement, in many respects, on our old guns, but, plainly, an artillery armed with it cannot hope to cope, on equal grounds, with one armed with heavier weapons. It is evident that now infantry fire has so increased in range and power, artillery fire must, to regain its proper position, do so likewise. We must have guns with high initial velocities, firing powerful shells. It is to shrapnel fire, hitherto untried in war, except to a small extent in the last, and then, according to Russian accounts, most successfully, that we must look, and evidently therefore the main armament of our field batteries must consist of the heaviest gun that can be manœuvred in the field. We cannot well extend the weight behind the team of our 16-pounder, but it would seem possible, judging from what others have done, that we could construct a field-gun of about 11 cwt., to fire a shell weighing 18 to 20 lbs. This would form the arm of the field batteries, and

possibly of the corps artillery. Taking into consideration, however, the increased use we shall see of earthworks in future wars, it would evidently be desirable to have some heavier guns with an army corps. To destroy parapets a powerful shell is required, and although an 18-lb. shell represents a powerful shrapnel, it is not a very powerful common shell. Looking at the fact that it is, as a rule, the duty of the divisional artillery to begin the artillery duel, and to advance with the divisions, while the corps artillery is more stationary, would it not be possible to arm the whole of the latter with 25 or 30-pounder guns? They would not be required to move fast, nor to vary their position much during the action, while the effect of such batteries, whether firing shrapnel against troops or common shell against earthworks, would be very great.

But I may, perhaps, be told that corps artillery should be composed largely of horse artillery, so that a reserve being kept in hand may be available to meet any unexpected attack or support a particular point. I would, however, venture to reply that what I may term manœuvre-battles are things of the past, and that sudden and unexpected attacks are, therefore, not so likely to occur. Lines of battle are so much further apart than in former days that the distance to be passed over by an attacking force is much greater, and consequently, unless local circumstances enable the enemy to approach unseen, a sudden and unseen attack is almost impossible. Moreover, the retaining power of the rifle would enable a General to hold such an attack back, to give time for the slower but more powerful artillery to come up. When it arrived, its effect would compensate for the slowness of its coming, while its superior range would permit its being brought into action further off. Besides which, it is an universally admitted axiom now, that artillery should not be kept in reserve, but that every available gun should be pushed forward to the fight.

Horse artillery must of course be armed with a comparatively light gun, and be organized so as to carry a large number of projectiles with the battery; the advanced position in which it so often acts necessitates this. Whether it would therefore be best to have a third calibre, or, using the same as that of the field battery gun, reduce the horse artillery gun in weight, and diminish the charge, as the Russians do, must be decided by others more capable than myself of answering so technical a question.

Lastly, whatever conclusions we may come to, as to the alterations to be made in our artillery, one thing is certain, that the first step is to alter our common shell which breaks into so many fewer fragments than those of foreign Powers. It is indeed in my opinion doubtful whether we should not look at the common shell merely as a species of flying mine, and increase its destructive effect by the use of gun-cotton, reserving the shrapnel for use against troops; this latter shell, however, should be constructed on the principle that its bullets should be sufficiently heavy to disable a man at the extreme shrapnel range and no more, thus giving the greatest number possible in each shell, the object being to make as many disabling hits as possible.

One means of parrying the destructive bullet fire to which artillery will now be exposed up to ranges of 1,500 or even 2,000 yards, is to be found in the iron shields suggested by Colonel C. B. Brackenbury, R.A.¹ To this point it would be well to direct our attention; and experiment on the best means of employing them would show whether the additional weight thus involved would be compensated for by the protection received, and whether the protection given by shields from bullet fire would counterbalance the use of an arrangement which would ensure every percussion shell bursting exactly at the place where it is wanted to act.

The introduction of these shields would of course necessitate the use of breech-loaders, but as the path of artillery progress seems to lie in that direction, this is not a consideration which need deter us.

As regards training, artillery, like infantry, must practise in peace what it has to do in war; the lines which should be followed out are now so universally admitted, that I need not particularize them here.

And now with regard to cavalry. I do not think that I shall find many dissentients, when I say that the introduction of fire at long ranges has considerably diminished the already lessened rôle of cavalry on the actual battle-field. Is it possible for cavalry to move over a distance of 1,500 yards or more under an incessant fire of breech-loading rifles? It would take at least 4 minutes to traverse this distance at a gallop, and in that time each infantry soldier even with the present weapons could fire 20 fairly aimed shots, and for the last 500 yards nearly every shot should hit; could any cavalry live through such a storm? The oft-quoted charge of the 7th Cuirassiers and 16th Lancers at Mars-la-Tour is no reply to this argument, as it was directed chiefly at guns against which a rapid moving cavalry may often be victorious, especially if they move in open formation. But it may be said that there are frequently occasions in the course of a battle, when a small body of cavalry may reap a sudden success. It is of course impossible to say that such cases will never occur; but a consideration of the conditions necessary for success will show that they must necessarily be very rare. For the chief element of success in such a case is surprise. This necessitates the cavalry being hidden up to the last moment, and then falling suddenly on the enemy before he has time to rally. Such an arrangement involves the cavalry being kept near the spot where it is to be used. To do this, necessitates a formation of the ground that would permit the cavalry being hid up to the moment of employment and being protected from severe fire; plainly such ground would, as a rule, be unfavourable for the movement of horsemen, or if a village or wood formed the screen, the attacking force, from the encircling nature of its advance, would discover the presence of cavalry before they were able to act in the manner it is suggested they should.

It is a remarkable fact that we constantly find this manner of using cavalry laid down in tactical books. The instances, however, in which it has actually been done in war are very few and far between.

¹ The late Dr. C. B. Eddy proposed a moveable steel mantlet, for the protection of artillery and troops, in 1869. See "Journal of the Royal United Service Institution," No. LV, vol. xiii.—Ed.

But on the other hand introduction of long-range fire has put another weapon into the hands of cavalry. It has forced them to adopt the rifle themselves in order that they may not be stopped by a few infantry or armed citizens when on advanced or outpost duties, or when sent on to seize by a rapid movement an important point. This in its turn permits the use of dismounted cavalry, who can cope on tolerably equal terms with infantry, and thus allows of enterprises which were impossible before each cavalry soldier carried a carbine. A perfect example of this kind of action is seen in the case of the French 12th Dragoons at Spicheren.

It will now be possible to throw large bodies of cavalry on the flanks or rear of an enemy's army without their being of necessity supported by infantry, a method of employment which opens a vast field to an enterprising cavalry leader.

To supplement the fire-power of cavalry, it will probably be well to attach mitrailleurs to them. They would be especially valuable from the fact that in most of the enterprises in which cavalry is engaged, it is the killing, and not the battering, power of guns which is required, and up to 1,400 or 1,500 yards mitrailleurs are more effective than field-guns. They are also very much lighter and more easily transported. They should be so mounted that they could be fired without unlimbering, in which process so much time is lost. I cannot but think that it is thus that the true use of mitrailleurs in the field will be found.

With regard to the firearms of cavalry, I would draw your attention to the fact that the introduction of the Martini-Henry carbine in its present form necessitates two kinds of ammunition. Its weight does not permit the infantry cartridge to be fired from it. I need hardly point out what a complication this will lead to in the supply of ammunition!

Germany and France are wiser than we are in this respect—they have but one pattern of cartridge for all small-arms. When the Martini-Henry rifle was introduced into our service it was intended to employ it for cavalry as well as infantry. Surely it might still be possible to reduce the weight carried by the former by a few pounds, in order to permit their carrying the same weapon as the latter. Its length might render it necessary to carry it across the shoulder, as so many of the Indian cavalry regiments do, or in the Namaqua bucket, as the Hants Mounted Volunteers did; but armed with it, our men would be a match for any other European cavalry, and this may be allowed as one argument for its adoption.

Table F gives the length, &c., of the carbines carried by the French and German cavalry.

The armament of the future for cavalry, however, is without doubt a magazine rifle such as I have already described. It is so important for cavalry when acting on foot to be able to pour in a sudden and very rapid fire that it can but be a question of a short time before we introduce it. For use against savages it would be of double value, increasing by several degrees the offensive power of our men. Moreover, it would be possible to have a magazine rifle to fire the same cartridge as our infantry weapon, but weighing only 8 lbs., the magazine

to hold six to eight cartridges, thus making up the rifle when wanted for use to about the same weight as the Martini-Henry.

I would further observe that by giving our lancers a carbine we have transformed them into the heaviest cavalry we possess. Now, whatever may be the advantages of the lance in combat, no one can say that it is a good weapon for a cavalry man acting on advanced duties. It would seem to me, therefore, that the lancer should be regarded as pre-eminently suited for the divisional cavalry—the cavalry for the battle-field—and that for advanced duties of cavalry we should have two-thirds light and one-third medium regiments, both armed alike with rifle and sword. It will probably follow, therefore, that the lancer should, as at present, carry his carbine in a bucket and his sword round his waist, whereas in the rest of the cavalry, the rifle should be on the man, the sword on the horse. Finally, I would observe that, as the offensive element of cavalry more than ever depends on pace, it is evident that the less we put on the horse, the better. At present, the weight of clothing, armament, and equipment carried by the cavalry soldier is nearly equal to his own weight. This must be altered.

Our men must be lightly equipped, well armed with a sword that *will* cut, and not the present modification of the kitchen poker, and a magazine rifle. But there is one thing we must not forget; good equipment and efficient armaments are two elements of success, but they are not all. Training is needed for cavalry as for infantry—training in the requirements of war such as drill alone can never teach.

Finally, I must say a few words with regard to the Engineers. With them, as with the rest of the service, the tendency of the period, viz., to increased pace in all the operations of war, must be borne in mind. Moreover, the increase in the use of earthworks, the destruction and construction of complicated structures, such as railways, &c., will tend to render necessary an increase in the number of engineers. We shall, therefore, have to augment their number beyond what is at present the case in our paper army corps. Further, we shall have to render them more mobile. It would seem to me, therefore, that it will be expedient to give a company of engineers, about 150 strong, to each brigade of infantry, while the corps engineers should be augmented by a troop of mounted engineers, whose special function it should be to act with the cavalry brigade. The foot engineers should have their kits carried in carts moving with the company, and they should carry the tools they will be called on to use, on their backs. The mounted engineers should be looked on from a twofold aspect. They may be required to move rapidly along roads, or it may be necessary to send them across country. In the one case, wheel carriage may be used, in the other, horsemen alone are permissible. The carriage I would propose is a four-wheeled Irish car, drawn by two horses, carrying five men, and driven from the box. The well would be used to carry tools, &c.; the valises would be placed under the men's legs. To each car two mounted men and one non-commissioned officer, with bricole harness, would be attached. The two mounted men could hook on whenever the car was required to move with extra rapidity or on difficult ground. I give in Table G

a detailed statement of the proposed troop of engineers. The mounted men could of course be used in case it was required to move across country when carriage could not be used.

And now, Gentlemen, I must conclude. I feel that I have but very imperfectly dealt with my subject, and that much which is of importance has not been even alluded to; but the time at my disposal has only allowed me to touch upon its main features. But permit me to add one word before I finish. It has often been said that the British Army is small, but it must be a perfect one. The path of progress to such an end is pointed out by three fingerposts of no uncertain direction. On the one is written increased mobility, on the other increased power of weapons, and on the third increased peace training in the duties of war. If we but follow these, the desired result will not be hard to attain.

TABLE B.—*Tools carried by the men (not Pioneers) in Germany, Austria, Russia.*

1 Battalion.

Nature of tools.	Germany.	Russia.	Austria.
Light spade	200	320	396
„ pickaxe.....	20	80	
Hand axe.....	40		

In France, each company (4 to a battalion) has a pack animal carrying 32 shovels or 128 per battalion, 8 pickaxes or 32 per battalion.

TABLE C.—*Contrasting Battalion Carriage as now existing with that proposed.*

As now existing.	Drivers.	Horses.	As proposed.	Drivers.	Horses.
No. 1 Wagon, Head-quarters.	2	4	No. 1 Wagon, Head-quarters, &c.	2	4
„ 2 „ Quartermas-			„ 2 } Quartermaster's and		
„ 3 „ ter's stores	2	4	„ 3 } supply wagons ... }	6	12
„ 4 Tool-cart	1	2	„ 4 } „ 5 Ammunition wagon	3	6
„ 5 } Small-arm ammuni-			„ 6 }		
„ 6 } tion carts..... }	3	6	„ 7 }		
„ 7 } Supply wagons..... }			„ 8 }		
„ 8 }	4	8	„ 9 }		
„ 9 }			„ 10 }	16	32
„ 10 } Company transport }			„ 11 }		
„ 11 } wagon	8	16	„ 12 }		
„ 12 }			„ 13 }		
Spare.....	2	4	8 Bât horses	8	8
Total	22	44	Total	35	62

TABLE D.—*Comparison of the Quickness of Firing of Kropatchek's Repeating Rifle as compared with an ordinary Breech-Loader, furnished with Krnka's Quick-Loader.*

A.—COMPARATIVE FIRING IN ONE MINUTE.

Kropatchek's Repeating Rifle.

Starting with the magazine loaded, the gun at the shoulder, and aiming:—	
Firing nine repeating shots from the magazine	18 seconds.
Closing the magazine	2½ "
Loading, aiming, and discharging nine cartridges, shot by shot	40 "
<hr/>	
Eighteen shots in	60½ "

The Single-Shot Rifle, Furnished with Krnka's Quick-Loader.

Starting with the magazine loaded, the gun at the shoulder, and aiming:—	
Firing ten shots from the magazine	27 seconds.
Putting a second magazine into its holder	3 "
Firing nine cartridges from the magazine	26 "
<hr/>	
Nineteen shots in	56 "

B.—COMPARATIVE FIRING IN TWO MINUTES.

Kropatchek's Repeating Rifle.

Starting with the magazine empty, the gun on the hip, and without aiming:—	
Loading the magazine with eight cartridges, 1st time	23 seconds.
Putting the ninth cartridge into the barrel	2½ "
Firing nine repeating shots from the magazine	15 "
Loading the magazine with eight cartridges, 2nd time	23 "
Putting one cartridge into the barrel	2½ "
Firing nine repeating shots from the magazine	15 "
Loading the magazine, 3rd time	23 "
Putting one cartridge into the barrel	2½ "
Discharging the nine repeating cartridges	15 "
<hr/>	
Twenty-seven shots in	121½ "

The Single-Shot Rifle, Furnished with Krnka's Quick-Loader.

Starting with the magazine empty, the gun on the hip, and without aiming:—	
Putting the magazine, with nine cartridges, into the holder	3 seconds.
Putting the tenth cartridge into the barrel	2½ "
Discharging the first magazine of ten cartridges	27 "
Putting the second magazine into the holder	3 "
Discharging the second magazine of nine cartridges	26 "
Putting the third magazine into its holder	3 "
Discharging the third magazine	27 "
Putting the fourth magazine into its holder	3 "
Discharging the fourth magazine	26 "
<hr/>	
Thirty-seven shots in	120½ "

TABLE E.—*Showing how the 122 rounds allowed per trained soldier are to be expended.*

Description of practice.	No. of rounds.	How expended.
Field firing.....	40	10 rounds on four different occasions; to include long-range fire.
Annual course	42	7 rounds at each of the following ranges (the first shot not counting for the score), 200, 300, 500, 600, 700, and 800 yards.
Monthly practice	40	1st class shots and marksmen { 5 rounds at 600 and 800 yards, alternate months. 2nd class shots.. { 5 rounds at 300 and 600 yards, alternate months. 3rd class shots.. { 5 rounds at 200 and 300 yards, alternate months.
Total number of rounds allowed annually	122	

TABLE F.—*Showing the principal dimensions and weight of the Carbines in use in Germany, France, and England.*

	German carbine.	French carbine.	Martini-Henry rifle.	Martini-Henry carbine.
	ft. in.	ft. in.	ft. in.	ft. in.
Length over all	3 3½	3 10	4 1½	3 2
	lbs. oz.	lbs. oz.	lbs. oz.	lbs. oz.
Weight of weapon	7 15½	7 15	8 12	7 8
	grs.	grs.	grs.	grs.
Weight of bullet	386	386	480	410
Weight of powder-charge.	77	81	85	80

TABLE G.—*Detail of One Troop Mounted Engineers.*

Officers, N.-C. Officers and men.	Mounted.	Dis- mounted.	Wagons.	Cars.	Draught horses.	Riding horses.
Captain	1	..	..	..	..	3
Lieutenants.....	3	..	..	..	..	6
Surgeon	1	..	..	..	..	1
	5					
N.-C.Os. and men :						
Sergeant-major.	1	..	..	..	..	1
Sergeants	9	..	..	..	..	9
Rank and file	24	60	..	..	..	24
Farrier-sergeant	1	..	..	..	..	1
Shoeing-smiths	1	1	..	..	..	1
Collar makers	1	1	..	..	..	1
Wheelers	1	1	..	..	..	1
Drivers	16	..	..	..	..	..
Trumpeters	3	..	..	..	..	3
Bâtmen .....	..	10	..	..	..	..
			2	12	32	..
	57	73	2	12	32	51

Total :—5 Officers, 130 non-commissioned officers and men, 2 wagons, 12 cars, 83 horses.

The CHAIRMAN : I hope that amongst the number here present there are some Officers who would be willing to furnish us with any criticisms on the lecture we have just heard, or any information of which they are in possession on the subjects brought before us. I see present Major Fraser, of the Royal Engineers, who has probably seen more of long-range fire than any of us, and perhaps he will give us some of his experience.

Major T. FRASER, R.E. : I have lately seen some experiments made with the Martini-Henry in long-range shooting, and I venture to think that Captain James's view that 2,000 yards is the limit up to which infantry can fire, is incorrect in being below the mark. As far as experiments go, we can at present count on very fairly accurate shooting up to 2,200 or 2,300 yards, even with the Martini-Henry. The other day some men of the Guards, who had never seen a long-range sight before, in shooting at 2,000 yards range, averaged 50 per cent. of hits within a width of 14 yards and a length less than 70 yards. This will show how extremely accurate long-range musketry fire promises to become. I venture to disagree with Captain James in his view that machine gun fire is better than artillery fire up to 1,500 yards. It may yet prove that the most important uses of machine guns are for long-range fire (2,000 to 3,000 yards) and for night fire. In the latter case, namely at night, musketry fire is unreliable except at short ranges, and case shot is not effective beyond very short ranges. Machine guns, when a proper allowance can be made for drift and wind, may be used with great success, certainly up to 2,500, and to a certain extent up to 3,000 or 3,200 yards. Captain James has also touched on field artillery, and it is a question whether he does justice to the new 13-pounder field-gun. I have seen the effects of the field artillery of most nations in Europe in actual warfare—in France in 1870 and 1871, and in Turkey in 1877 and 1878—and my impression is that the effects of the 13-pounder on parapets are greater than any I had before observed. No doubt, the French and Germans, and the Russians and Turks, had field-guns very inferior to those now made. The shrapnel of guns of the type of the present 13-pounder will probably be effective in a degree up to 4,000 yards, if you can get the means of laying the gun straight, a condition which ought to be practicable enough, but which I venture to doubt is secured by present arrangements, and provided accurate time-

fuzes, capable of standing climate, can be made. With regard to common shell, I do not think its value is so great as Captain James states. He puts its limit at 4,000 yards. Its effects seem small at the shortest ranges, and I should say next to nothing over 2,000 yards. As far as I have been able to see, the effect of shrapnel with time-fuzes is ten- or twenty-fold that of common shell at the least favourable ranges to the former, and its further advantages are that, being burst in the air, it hits from above downwards; hence its moral effect, so to speak, is also very much greater. Speaking roughly, ring shell seems to be about four times as effective in the open as common shell as regards numbers of splinters. The next point that stops artillery progress is the want of a light carriage which will enable you to shoot with a light gun and a very high velocity, because, with the existing rigid carriage the shock is so great that, even with less than 1,600 feet of muzzle velocity, the carriage sometimes recoils 20 feet, and has to be heavy in proportion. The Russians have gone a long way towards getting a good carriage, which enables them to stand a higher velocity. When mobile guns with much higher velocities are introduced, we may see artillery resume its old position of marked superiority over the infantry in long-range fire. At present the infantry have a great advantage, and one that the next stage of progress will increase, in having an arm that will kill at 3,000 yards and carry with accuracy up to 2,200 yards. One point about long-range fire of all arms is that the depth of ground swept by each shot rapidly diminishes in proportion to the range, in consequence of the increase in drop. For instance, if a bullet only falls 6 feet in 100 yards at a short range, the shooting is effective as long as the service range does not exceed 100 yards; but if you are firing at 2,000 yards, where the amount of drop is, say, 6 feet in 24 yards, as with the Martini-Henry, you get a comparatively small sweeping effect. We must not, therefore, fancy because we shoot straight at long ranges with the small arm that, therefore, we can get anything approaching the effects obtainable at short ranges, and here it is that, owing to the flatter path of the shell, artillery fire has a great advantage at all ranges, and especially at the longer ranges. For this reason it is desirable to do everything that will augment the depth of effect of all fire by getting the path of the bullet or shell as flat as possible. To my mind, the improvement of the musket is, looking to our short service, almost the most important military question of the day, because we may, by the perfection of the arm, balance the imperfections of the men, and the great advantage of the introduction of a new rifle with a light long bullet and a flat trajectory, in addition to greater portability of ammunition, will be that you greatly improve the *short-range* shooting, and at the same time you do not injure, indeed must improve, that at long ranges. A point lately forced on one's attention is that infantry should be practised in firing volleys lying down. I have quite lately seen a number of experiments conducted by troops firing lying down. At first they could not fire volleys in that position, but they soon picked it up extremely well, with generally increasing effect every time it was tried.

Captain James recommends a very great increase in the weight of the artillery. I am sorry to venture further on an artillery subject, particularly in the presence of the artillerymen who are here, and who are so competent to deal with it, but I may mention that I noticed the Turks found the 9-centimetre gun of Krupp very cumbersome in 1877, whereas with the 8-centimetre gun, which is less than 8 cwt., they got about extremely well in difficult country. In France, where the roads are the best in the world, the Germans had exceptional advantages in moving artillery. We must not, however, suppose that because in France they could move with a comparatively heavy gun, we can do so in every country. For our own purpose, we chiefly have to deal with uncivilized and roadless countries, and starved horses, and therefore I am inclined to think that there would be considerable disadvantage in increasing the weight of the field artillery. The Russians, it is true, had in 1877 some heavy shell guns, but they were absolutely useless at moderate ranges, because the velocity was so very low that the shell remained in the ground and had no effect. What we want would seem to be a gun with a shell of a weight such that a number can be carried, of a shape to hold a number of heavy bullets, and that will at the effective ranges have the best attainable velocities, and consequently the greatest sweeping and striking effect.

Colonel C. B. BRACKENBURY, R.A.: Having been on the opposite side to Major

Fraser in the late war, I beg to confirm very strongly his statement as to the extreme power of the Martini-Henry rifle at long ranges. Unquestionably, whether aimed or not, it created a very large number of casualties indeed among the Russians at ranges of 2,000 yards and upwards. I saw nearly the same thing happen in France in 1870-71. Even by the French Chassepôt, men were killed at ranges of 1,600, 1,800, and 2,000 yards, but no battle has been, or ever can be, decided by such shooting as this. It is now the fashion to be always talking about long-range infantry fire, and it seems taken for granted that artillery fire is only useful, or much more useful, at long ranges than at short. The fact is exactly the reverse, and if the gunners are able to hold their own, and to exist in the face of infantry at short ranges, the effect of their fire at these ranges becomes something perfectly astonishing. Some experiments have been made at Okehampton which give a very fair idea of the proportion of results obtained. The object was to test the proportionate effect of artillery fire at ranges from 1,000 yards downwards. At 1,000 yards the result against the dummies was 18 per cent. damage in a minute, at 600 yards 33 per cent., at 400 yards 40 per cent., at 200 yards 50 per cent., and at 100 yards 75 per cent.

Sir WILLIAM CODRINGTON: In the open?

Colonel BRACKENBURY: In the open; but some of the dummies were behind rocks. I am, however, merely speaking of the comparative effect against the same target at different ranges, and we find it rises from 18 per cent. at 1,000 yards up to 75 per cent. at 100 yards. How necessary is it, then, that if possible we should enable the gunners to *remain*, I do not say to *advance* to 100 yards, but to be able to remain until the last moment. It was with this idea in view that I proposed that the artillery should carry light shields for its own defence, separate from the gun carriages, but to be erected when necessary, so that the gunners could remain where they were in the face of the enemy. I have very carefully avoided becoming an inventor. I wish to lay my head on the pillow at night to sleep in peace, and I never knew an inventor who was able to do it, therefore I have carefully abstained from recommending any particular shield. However, it happened that Sir William Armstrong was taken with the idea, and tried experiments, when it was then found that with steel shields $\frac{3}{8}$ of an inch in thickness, the bullets from the Martini-Henry were completely stopped at 100 yards. Sufficient of these plates and of the apparatus required for a whole battery could be carried on two wagon bodies; therefore there is no question of a large amount of extra carriage. And I need hardly say that the ammunition which they had would have been very much more valuable if they were enabled to remain where they could kill 75 per cent. of the enemy, instead of 18 per cent., or, as it would be at further distances, 10 or 5 per cent. I am very anxious to confirm what Major Fraser said with regard to the difficulty of carrying heavy guns about. In this country we can easily move very large guns with the fine horses we have; but if we are to take these fine horses into a campaign in a foreign country, we shall very soon find that they will lose health and strength, and we shall have to fall back upon the horses of the country in which we are fighting for the time being; and we must not expect that these would be able to drag about very heavy guns on bad roads. The direction of modern artillery progress is in getting the greatest possible effect out of the lightest possible gun. As Major Fraser says, the carriage is the difficulty. As for the guns, at present there is no difficulty at all. There is a steel gun, a 9½-pounder, made by Sir William Armstrong, which only weighs 4½ cwt., and the whole carriage, ammunition, and everything together, only weighs 26 cwt. That gun was fired at 1,100 yards at a target representing something like a regiment of cavalry advancing, and 16 shrapnel shells gave 3,657 hits, of which 3,359 went through the target, proving that they hit hard. That will give some idea of the extraordinary progress which has been made by the adoption of this particular shell, fuze, and gun, and it now remains to have the carriage improved. The velocity was only 1,500 feet, and 1,500 feet is a controllable velocity. We may safely go up to velocities of 2,000 feet, so far as the gun is concerned; and field-guns at Shoeburyness have thrown shells with velocity of 2,500 feet. All that is required is, that we should have a proper carriage on which the guns can be mounted and worked.

Captain G. W. COCKBURN: We have heard something this evening about abolishing volley firing. This was an old hobby of mine as far back as 1857, when, during

the Indian Mutiny, I had a very remarkable practical instance of the uselessness of volley firing with the weapon we then had, namely, the Enfield rifle. I was with the 42nd Highlanders, and I believe in my company we had the best and the third best shots in the whole Crimean Army. We were advancing in échelon of companies from the left. We were wheeled up to the top of a slope to our right, and there found a whole cavalry regiment of rebels encamped and asleep at about only 100 yards distance. I well remember having much the same sensation as I had when a boy, doing a little bit of poaching, and coming suddenly upon a whole covey of partridges on the ground. I gave the order to fire perhaps rather hurriedly, and as the result, with this cavalry regiment 100 yards off, I do not think they knocked over above two or three horses, though they certainly served the purpose of waking the men up. The whole ten companies came up one after another, and poured a volley into the regiment; but I do not think they knocked over five men and horses. I left that action abusing the Enfield rifle, and wishing rather for Brown Bess, because I did not think it was possible that the shots could have gone so far over the heads of the men, and have made such bad shooting. A few months afterwards, at the taking of Lucknow, I had a marvellous instance of what could be done with independent firing. I had the honour of being sent out with a picket of a few sharpshooters, and in a very short time we stopped the fire down the whole wall. I found every man of mine taking rests on a little bank that there was, and at 100 and 150 yards distance they could put their bullets in through the different loopholes with certainty. I merely used my glasses and told off my men to different loopholes, and as soon as a rifle was shown a bullet went in at the loophole in question. From that day until a short time ago I had despised volley firing, and thought a great deal of independent firing. However, some one who has just come back from the Cape has told me that it was impossible to use independent firing with any effect at close ranges. The smoke entirely blinded the men, and they were obliged to adopt volley firing. How, then, can we drop volley firing in practice, if the men cannot see in close order with independent firing? That brings me back to the question of tactics, and I am of opinion that close order should be done away with as much as possible, and men used entirely in open order; and I think a Commanding Officer who keeps his men in close order in front of present weapons should be hung for simple murder. As to the British square, what we should have now is a number of lines in open order, covered by others, no two men within ten yards. This brings me to a second remark I have often made, and which I should like to have answered here. The success of the Germans in the Franco-German War was frequently set down as due to artillery fire; but how would it have been if the French had not been put into shambles, if they had been put into open order instead of close order? Would that artillery fire then have had any effect at all? I maintain it would have been the most expensive way of killing men. I am glad that we have had the shield mentioned to-day. It is an old hobby of mine, and I think I suggested, in 1857, that every gun should be armed with a light shield in front, in order to keep the rifle fire from the men working it. I am very glad to hear that it has been so excellently carried out by Colonel Brackenbury and Sir William Armstrong. With regard to cavalry formation in open order, I should certainly adopt that method. I was Adjutant in a cavalry regiment for many years, which I carefully trained to charge in open order, and I lived in hopes of having the honour to lead a charge against a square; because, though I believe no cavalry in the world could approach in close order a line of infantry skirmishers, properly used, with the present weapons, on the other hand, I believe there never was a regimental square formed on an open plain that a cavalry regiment could not ride off the face of the earth, charging in open order, and closing in upon the square.

Lieutenant-Colonel LONSDALE HALE: I would draw attention to some competitive practice between artillery and infantry at Bourges, in October of last year, in which the results were in favour of the artillery even at 800 yards range; and also to a statement in the recently published "*Rôle des Localités à la Guerre*," by Captain Thival, to the effect that in the five great wars of Italy 1859, America 1863, Denmark 1864, Bohemia 1866, and France 1870, the proportion of wounds inflicted by three arms was:—Rifles, 39 per cent.; *arme blanche*, 2 per cent.; guns, 18 per cent.

Mr. C. F. LOWE, Queen's Westminster R.V.C.: I fancy one of the great problems of modern days is how to combine accuracy of fire with rapidity, at the same time exposing the troops as little as possible. When the Rifle Brigade was formed at the end of the last century they were taught to shoot in four positions—the shoulder, knee, prone, and back positions. Sir William Cope has been kind enough to lend me a copy of a book on rifle shooting, first published in 1803, which I produce, written by Ezekiel Baker, the inventor of the rifle with which the brigade was armed. It contains four coloured plates, showing the riflemen in each of the four positions; in the prone position he used his hat as a rest, and in the back position the recoil is taken by the sling, which is put over the left foot. I find, in Sir William Cope's "History of the Rifle Brigade," that at a fight in Spain, in 1809, during Sir John Moore's campaign, a man named Tom Plunkett, the best shot in the brigade, ran out of the front, and throwing himself on his back on the ground covered with snow, caught the sling of his rifle over his foot, fired with deliberate aim, and shot a French General dead. He must then have risen to his feet to reload, and, with his second shot, he killed the trumpeter, who rode up to assist his chief; then, being pursued by cavalry, and not being furnished with a breech-loader, he had to cut and run, to save his life. This incident was related to Sir William Cope by an Officer who witnessed the occurrence, and that is how the training of the Rifle Brigade was put in practice, in actual warfare, at the beginning of this century. When the Enfield rifle was first issued, it was put into the hands of the soldiers during the Crimean War, and they changed weapons while before Sebastopol. From the evidence of two veterans in the Black Watch, named Mumford and Fox, who are now sergeant instructors of the Volunteers, it would appear that the smartest men from each battalion were put on special duty, to act as sharpshooters in the trenches before Sebastopol, and these men had to find out for themselves how best to use the new weapon put into their hands; they fired standing, kneeling, lying down, in the prone position, and lying down on the back, and also sitting, according to circumstances, and it is related in detail how they used the back position with deadly effect. I am also told by another sergeant instructor that old soldiers, who had been in the Crimea, taught their younger comrades how to use the back position, while at Cawnpore. Such is the manner in which the back position has been used on service, by men armed with muzzle-loaders; but for some inscrutable reason it is now tabooed as a military position. To show what accuracy can be attained by the Martini-Henry, at short ranges with the back position, I may mention that a recruit who had only had a rifle in his hand for a few months, out of forty consecutive shots at the 200 yards carton target at Wimbledon, put no less than thirty-nine of them into an 8-inch bull's-eye. The same volunteer, firing on his back, has made the best shooting and the quickest time in the field firing and skirmishing competitions of his regiment at Caterham. As for rapid firing, I myself witnessed a noted marksman, named Farquharson, using the Henry rifle at Wimbledon, in 1870. In two minutes he put fifty-two shots into the target at 200 yards, without a miss, firing in the back position. But with the Soper rifle, forty-three shots have been fired in one minute, in the presence of Colonel Fletcher, and of these, forty-two hit the target at 200 yards. A still more extraordinary experiment was tried with the Soper rifle. A man trained his rifle on a target at 200 yards off, and, after having been blindfolded, he fired twelve shots, all of which hit the target. From these and other performances with the Soper rifle, at Wimbledon and elsewhere, it is evident that a soldier, armed with a proper rifle having a side lever, and using that particular variety of the back position ridiculed by "Punch," can keep up a shower of bullets on any particular spot, even though his view may be thoroughly obscured by smoke—a performance impossible in any other position. I believe in some situations, such as on the slopes of the hills at Brighton, it is absolutely impossible for the soldier to use the prone position while firing down hill; he must fire on his back if he fires at all, lying down. After a soldier has rushed to the front, his whole body has been graphically described as being a palpitating mass. The back position is the most steady position for firing under those conditions. I ask military men to consider whether the best formation for volley firing is not to put the front rank on to their backs, and the second rank on their knees; there are then two distinct lines of fire; these may be multiplied. There may be one rank on the back, two on the knee, and a fourth firing from

the shoulder, and by these means is obtained the only possible combination of extreme accuracy and rapidity of fire, coupled with the smallest possible degree of exposure. I venture, therefore, to submit that every soldier's training must be regarded as incomplete until he has learned how to shoot on his back, as well as in the other three positions, and I am glad to see that the gallant lecturer recommends that any position should be allowed during target practice. Twenty years' experience as an amateur must be my apology for having troubled you, and I thank you, Gentlemen, for the patience with which you have heard me.

Sir WILLIAM CODRINGTON: Without entering into the many subjects that have been mentioned, because every part of the lecture is a subject of importance to the different arms of the Service, I should like to ask one question of the lecturer. I see there are thirteen 4-horse wagons to a battalion. I should like to know where these are to be placed in a brigade, or division, because General Officers have to think how they are to march in brigade or in division. They want to know what are the *impedimenta* when troops are to be formed in line or in any order of battle for fighting. I should like the lecturer to give us the place these are to take in the line of march, if that line of march is to be at all ready for fighting. I should also like to know the number of rounds and the weight of ammunition proposed by the lecturer to be carried by the soldier.

The CHAIRMAN: I think it is a very good rule that the Chairman in making any remarks he has to make, should make them before the lecturer replies, because otherwise it would appear as if he were to put his opinions forward as something prescriptive, which they should not be. We have heard an extremely interesting lecture, and I am only sorry that there were not more here to speak on the subject. The lecture is not only good in itself, but it opens up subject after subject most worthy of attention. I shall confine myself as much as I possibly can to a few thoughts that have crossed my mind while listening to it. It is one of the weightiest subjects of the day. There was an enormous deal of firing at long ranges during the Franco-Prussian War produced chiefly by indiscipline, that is to say, by the nervousness of recruits. I do not think it was the case with the Prussians, because one of the great points of their drill is what I call "fire discipline," which is regulating fire. For years before the war, this was adhered to, it was adhered to most carefully during the war, and is adhered to to the present day. But the French troops, particularly after the old soldiers were killed or disabled, and the regiments were filled by recruits, fired at enormous ranges. One of my dearest friends was killed at the entrance of St. Marie aux Chênes by a bullet from St. Privat, a distance of over 3,000 metres. The General who commanded the attack on St. Privat talked to me over and over again on the subject of that terrible attack. He said their great suffering was at the commencement of the advance, and the nearer they got the less they suffered, showing what the effect of long-range fire from the French Chassepôt may be. Not that it was intended probably. The gentleman of whom I spoke, my dear old friend Colonel von Eckhart, rode out from St. Marie, because the fire was so hot at that distance that he was anxious to see whether he could get the regiment out of the village in support of the remainder of the Division, and, as I told you, he was killed at the distance mentioned. Like all advance in warlike art, the fact of this long-range question having cropped up, leads us to one great consideration, that the more we improve our arms, the more we must improve the instruction of our soldiers, and I think our lecturer has very well led up to that point in what he has given us to-day. A remark which I read the other day gave me great pleasure, because it showed that the Volunteers pay great attention to that subject. This was the comment of a German Officer on the late Volunteer Review, published (I think) in the *Cologne Gazette*, translated and commented upon in the English papers, in which he expressly said the one point that impressed him most during the review at Brighton was the able manner in which the Officers of Volunteers controlled the fire of their men, increased it where required and diminished it where it was no longer required. Captain James (and he is not the only person who has mentioned the same thing lately) has fixed upon a calibre for our new arm much smaller than that at present, which is .45. .38 is certainly a very small calibre. I have been shooting with it for some years with an Express rifle; but of course with a very much elongated bullet you get a greater weight of lead, and

therefore a more smashing power. After all, the great object in war is not to kill ; of course you try to kill to a certain extent, but it is much better to disable men, because a man with a broken bone takes another man to look after him ; he is really and truly a greater loss to your enemy than is a dead man on the field. I hope in time to see the solid metal cartridge introduced in our Service. Why on earth it has been so long kept down I cannot conceive. During my official stay in Germany, I was in constant communication with the inventor, General Berdan, formerly of the United States Volunteers, and there seems to be something which I certainly am not able to explain, which has kept it from being introduced into our Army. I believe one reason given is the weight. Well, if you reduce the calibre you can afford to have a somewhat heavier case. But another reason given is the expense. That is simply ridiculous, because we are not at war every year, we are not at war every third year, we are not at war more than once in five years, and the only cartridges lost, and therefore absolutely wasted, are those that are used on the battle field. In peace there is no reason why a single cartridge should be lost, and the cartridge case can be loaded ten times without any difficulty. I perfectly remember when the solid metal cartridge was introduced in Berlin, going out to an experimental parade which the Emperor held for his nephew the Czar to show him the terrible effect of the rapid firing of the Mauser which had just been introduced, and I particularly asked an Officer in the Fusiliers of the Guard to tell me afterwards what had been the waste of cartridges. He told me in his company they had not lost one, and that the percentage of waste throughout the whole battalion was very small indeed. Of course the great expenditure of ammunition is in the practice, and most cordially do I wish that Captain James' ideas, as to increasing the number of practice-rounds that our troops have annually, might be acceded to. But that is where the great expenditure of ammunition is. The expenditure of ammunition in war is nothing to the expenditure of ammunition in peace, because war comes so very seldom, but in peace it is constantly going on, and in peace the cases need not be wasted. We have heard a paper which not only has given rise to a good many remarks here, but which will leave to all of us subjects for consideration hereafter, and if Captain James has any replies to offer to the observations that have been made, we shall be very glad to listen to him.

Captain JAMES : I propose to go through the remarks made, and to answer them *seriatim*. Major Fraser appears to think that I underrate the value of mitrailleurs for long-range bullet-fire. This is not the case. What I want to bring forward is, that the mitrailleuse is, from the particular nature of the fire it gives, eminently suited against cavalry. Cavalry forms a large target, and it is a target which is just as effectively crushed by bullets as by shells. Now, from a mitrailleuse, a much larger number of bullets per minute is obtained than from any gun firing shrapnel. It is also very much lighter. Mitrailleurs of less than 100 lbs. weight will fire 600 or 700 shots a minute, and such a weapon seems to be the very weapon for use against cavalry.

Sir WILLIAM CODRINGTON : Up to what range ?

Captain JAMES : Up to 1,300 or 1,500 yards. Major Fraser suggests that I underrate the experiments made by the British Government with regard to field-guns. I do not do so. I know the 13-pounder is in many ways the best gun yet produced, and I believe the 13-pounder breech-loader, which is being made, is still better. But these guns are not now in the Service, and the guns we have here (Table A) are now in the hands of European troops. Of course, as Major Fraser remarked, the great drawback to introducing guns with high initial velocity, which means long range, is the very great recoil ; that has been met in Russia by the adoption of a particular form of carriage. It is difficult to explain without diagrams, but the carriage has the means of absorbing recoil in itself, and is said to be highly successful. With regard to the fact that at extreme infantry long ranges, it is more difficult to hit an object on account of the increase in drop, of course, the longer the trajectory, the greater the angle of descent. But that is in a way made up by the fact that the longer the range, the more inaccurate is the shooting, and German experiments all tend to show, that at any practice beyond about 1,000 yards, nearly always the same depth of zone is covered—that is, if 1,000 men fire at an object 1,000 or 1,500 yards distant, in either case the bullets they fire will cover

about the same depth of ground. Still, at the same time, there cannot be any doubt that the rifle of the future must be one which has a very much flatter trajectory than any rifle at present in use by any European Power, and that is why I propose a rifle with '38 bore, firing about the same weight of bullet as the French and Prussians use at present, with 100 grains of powder charge. Such a rifle would practically sweep the ground up to about 600 yards. With regard to the weight of guns, I am sure anybody who has seen anything of guns in a wild country must know that heavy guns are not suitable there. But we have to meet two cases; we have the case of a European war, when we shall have the same roads to go on as other nations have, and then we should have a heavy gun. On the other hand, when we have to go to war in savage countries, then we must have light guns. But from what I saw recently at the Cape, I am quite sure that the 9-pounder of 6 cwt. can go anywhere where a wagon can be taken, and this, although light, is yet an effective gun. Artillery Officers have quite agreed with me on this point. I admit, that when we have to fight in mountainous countries, we must have a lighter gun, such as the new 7-pounder, which divides into two pieces. (Sir WILLIAM CODRINGTON: Is it a mountain gun?) Yes; it has been used in Afghanistan lately. What I say is, given a country, in that country we should take for the bulk of our artillery the heaviest gun that can be manoeuvred. I am particularly careful to say, that *can* be manoeuvred, and do not mean a gun that can only move along the high roads. I am pleased to hear Colonel Brackenbury confirm what I say about long-range infantry fire. General Todleben, in a letter describing the Siege of Plevna, said the Russians suffered severe loss up to ranges which represented in English measure about 2,300 or 2,400 yards. I would also draw attention to the fact that when the Prussian Guards attacked St. Privat, the attack was absolutely stopped at about 800 yards, and that they certainly began to feel the fire at three times that distance. I know it has been stated by a German Officer, that the dust kicked up by the bullets was so great that there was a perfect mist in front of them; at any rate, within a space of not more than three-quarters of an hour, they lost 8,000 men, and that at long ranges, because the attack never got close. Colonel Brackenbury says, the close range of artillery is much better than the long. I quite agree to that; the only thing seems to be now, whether it is always possible for artillery to approach within short ranges. There are dozens of instances in the Franco-German War, where guns did get within close ranges, and notably, the case of the two Bavarian guns at Bazeilles, but they lost nearly the whole of their detachments. No doubt, that wherever guns can so be brought up, their moral effect is very great. Therefore, in such positions there can be no doubt, shields, which protect you from infantry fire, will be very useful. Colonel Brackenbury has told us of some experiments recently made by Sir William Armstrong. Krupp has also lately made a gun of much the same character, and even the muzzle-loading experimental 13-pounder is no longer at the head of weapons. I think Captain Cockburn rather mistook the proposition I made about volleys. I do not propose to abolish volleys, on the contrary, I think it is one of the necessities of modern warfare to use them, because wherever independent firing is employed, the troops are covered in smoke, and if men are firing independently under fire, it is very difficult to stop them; I think, therefore, we should introduce the use of volleys in order to have fire discipline.

I should like to say one word about what Colonel Hale said about the losses from artillery fire. We always get a great number of statistics after a war, but I would draw your attention to the fact that these statistics are deduced from a very small number of cases. We all know that there is not a committee appointed to go over every field of battle, and see how each man was killed, and you will find, in a late German work on the subject, the number of cases from which these so-called statistics are produced, is very small in comparison with the total number of killed and wounded during the war. On this point very largely depends the way in which artillery fire has been so much derided. We are constantly told, "You must 'prepare the attack by artillery fire,'" and we are also told that artillery fire does nothing. This is a distinct contradiction of terms, and I believe the explanation is this, that you get your statistics as to the result from a certain proportion of wounded. Now, a man hit by a shell, or a large fragment of shell, is not a wounded man, he is a dead man; and therefore I think you must not say, because from

perhaps one-tenth of the number that have been wounded during the war, only 5 per cent. have been affected by artillery fire, that therefore artillery fire is useless, or that such statistics represent in any way what the real effect of artillery fire is. Moreover, you must remember in late wars we have hitherto been dealing with guns with low initial velocities, and not using shrapnel shells. This we shall see no longer. Even if the effect, as Colonel Hale says, was 18 per cent. in the Franco-German War, it is very much more likely to be 40 per cent. in the next war, because of the increased value of the gun firing shrapnel. Mr. Lowe has been good enough to draw our attention to the question of position. I quite believe you do get better shooting from the back position in a large number of cases. But I am a little inclined to doubt whether, for use in large numbers, you will find the back position one that can be used with advantage; it is more difficult for the soldier to get up from, he is more out of hand; it would be very much more difficult for the Officer to know whether he was hit, or was not, if he chose to lie still. Sir William Codrington has asked me to tell him where I propose the wagons should go in the line of march. If the lengths of road occupied by what is now the regulation wagon equipment and by my proposition be worked out, it will be found that the latter does not occupy very much more ground. Carts with horses occupy relatively more space than wagons. If you have three two-horse carts to do the work a six-horse wagon does, the three carts and their horses occupy more ground than the six-horse wagon. Of course, my proposition is only tentative. I admit it would be a little longer, and also more expensive, but I think the advantage of having men absolutely independent, so that a company can be detached at any moment, is very advantageous, and moreover, men cannot carry everything on their backs. The commonest thing to come across in reading about the Franco-German War is, that when troops had to be sent off in a hurry, the very first thing they did was to put their knapsacks into carts. Let us once and for all admit this and do it in peace time. With regard to the position of the wagons on the line of march, they would be under the same rules as at present.

Sir WILLIAM CODRINGTON: The position on the line of march is what I wanted to know.

Captain JAMES: The ammunition, of course, would always accompany the battalion, and under ordinary circumstances I presume the whole of the carts would follow at the end of the brigade or division. That would be a question for the General to regulate according to circumstances. I was much pleased to hear a remark from General Beauchamp Walker with regard to killing, that we do not want to kill the enemy. We have rather had a tendency to believe that we want an infantry rifle that will absolutely kill. We do not want anything of the sort. If we could invent a rifle which would never kill, but only wound, that would be a greater progress in war than anything that has yet been done. With regard to the solid-drawn case, that is a subject that has been a good deal discussed of late. The Boxer cartridge is, in my opinion, the worst cartridge used by any nation. It is said that the solid-drawn case is more expensive. I do not think the British nation need hesitate for the question of a few thousand pounds. Of course, I know we have all the plant at Woolwich for making the Boxer cartridge. We had once upon a time the plant for making Brown Bess, but nobody proposed to keep Brown Bess going in the Army for that reason; therefore, if we all believe the solid-drawn cartridge is the best, let us put all the machinery for making the Boxer into the sea to-morrow, and introduce the machinery for the solid-drawn case. But I do not think the latter is more expensive to manufacture, for this reason, that the question of expense depends in the long run on two things: first, the amount of metal, and, secondly, the cost of assembling the parts. The solid-drawn case is lighter, *i.e.*, contains less metal, and in the Boxer there are many more parts to assemble than in the former. The Boxer is made of two metals, and electrical action is thus likely to be set up. I may add that no nation uses the Boxer cartridge. No match rifle is made for it. It cannot be used efficiently with any mitrailleuse, and, lastly, it cannot be reloaded. The solid-drawn case can be, and, as a practical fact, American rifle-shots prefer reloaded cases. I do not think there is any other point to reply upon.

The CHAIRMAN: I am sure the audience will empower me to return their thanks to Captain James for his interesting paper.

Monday Evening, May 10, 1880.

ADMIRAL SIR FREDERICK W. E. NICOLSON, C.B., Bart., Vice-President, in the Chair.

RECENT IMPROVEMENTS IN THE COMPASS, WITH CORRECTORS FOR IRON SHIPS.

By Sir WILLIAM THOMSON, LL.D., F.R.S., Professor of Natural Philosophy in the University of Glasgow and Fellow of St. Peter's College, Cambridge.

THE improvements which I have made in my compass since the date of my first communication to the Royal United Service Institution (February 4, 1878) have had for a primary object to obtain greater steadiness of the compass in vessels of war during gun-fire, and in steamers generally in which there is great vibration, due to the working of the engines, screw, or other causes. Improvements of some importance have also been made in the system of magnetic correctors for the semicircular and heeling errors, and in the addition of an adjustable Flinders bar for the automatic correction of that part of the semicircular error which depends on magnetization of the ship by the vertical component of the terrestrial magnetic force at the ship's place. I have also made an improved dipping needle instrument which is much less cumbrous and at the same time more sensitive and more easily used than the marine dipping needle which I described in my former communication.¹

In my present communication I shall first describe the mechanical improvements, and then go on to explain their application for keeping the compass as nearly correct as may be for practical use at sea.

To produce such steadiness of the compass-card as has hitherto been obtained in steamers which have powerful engines, and where there is much vibration, it has been customary to suspend the bowl by means of india-rubber bands. A serious objection to this method is that the india-rubber is liable to become rotten by exposure to heat or oil, especially if it is used in fine enough bands to give the requisite steadiness in all circumstances. After many trials of metallic springs in lieu of the india-rubber, I at last found a plan of brass spring resembling a rope grummet (A, Figs. 1, 2, 3, 4, 5, 6), but with elastic brass wire instead of the rope strands, by which I succeeded in obtaining more satisfactory steadiness of the compass than with india-rubber. The construction of this brass grummet-ring and the mounting of the compass-bowl upon it, may be described as follows:—A single wire is first bent and its ends are united by soldering or brazing, so as to

¹ See Journal, Vol. xiii, No. XCIV, p. 91, *et seq.*

RECENT IMPROVEMENTS IN THE COMPASS WITH

by Sir William Thomson I.L.D.

Fig 1

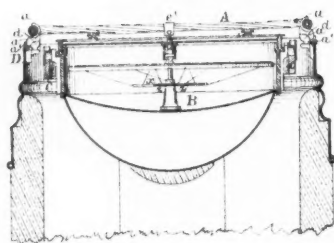


Fig 2

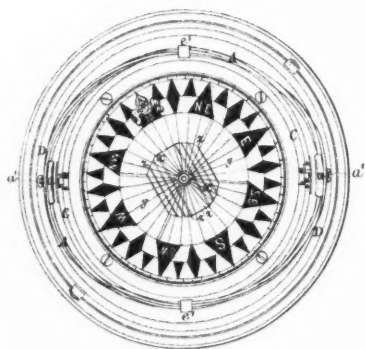


Fig 5

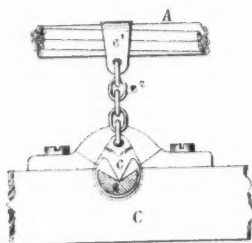


Fig 6

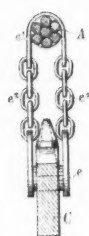


Fig 3

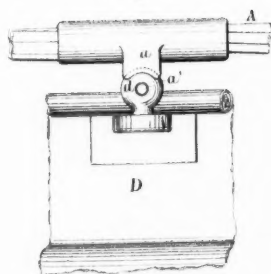
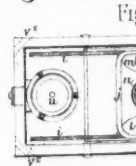
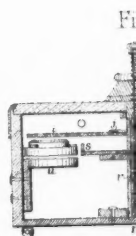
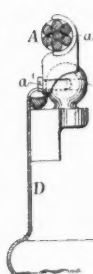


Fig 4



form a ring of the proper size. This serves as a core on which a second brass wire is laid on spirally, six turns round the core (Fig. 6). The ends of this second wire are also united by soldering or brazing, and thus an elastic ring is produced strong enough to support the compass-bowl. The compass-bowl is suspended from the elastic ring with the intervention of a rigid gimal ring. The elastic ring has two sockets fixed at the ends of a diameter, which rest on two balls attached to the brass rim of the binnacle stand (Figs. 3 and 4). The elasticity of the ring mitigates the effect on the knife-edges bearing the gimal ring and bowl, and on the point bearing the compass-card, of vertical tremors of the platform on which the binnacle rests. The knife-edges of the gimal ring are supported on two grooved stirrups, hung by chains from the elastic rings (Figs. 5 and 6). This suspension mitigates the effect of horizontal tremors of the platform.

Figs. 1, 2, 3, 4, 5, 6 illustrate the suspension of the bowl from the elastic ring.

For ascertaining the heeling error I use an auxiliary instrument for comparing the vertical component of the earth's magnetic force on shore with the vertical component on board ship. This instrument is constructed as follows:—Two magnetic needles of hardened steel wire are joined together and supported on two iridium points in a line at right angles to the lengths of the needles, and passing as nearly as may be through the centre of gravity of the needles and frame. One of these points rests on a flat support of sapphire or other suitable hard material, and the other point rests in a cylindrically shaped support of similar hard material.

The needles are accurately balanced so as to be horizontal when resting on the points before being magnetized, and they are then magnetized. The needles are brought to a level position again by a vertical magnet placed at equal distances from the four poles of the needles, and capable of being moved up and down. The position of the vertical magnet, according as it is higher or lower, gives a greater or less vertical force on the needles, the amounts of this force being determined by experiment for different positions of the vertical magnet.

This dipping-needles instrument is shown in Figs. 7 and 8; *ii* are the magnetic needles connected together by the framework, *jj*, and supported on the tops of the columns by two iridium points, *kk*.

When the instrument is used in the binnacle the compass bowl is taken out and the instrument is put in its place. The instrument is supported by cords from the elastic ring of the compass, which can be lengthened or shortened to adjust the instrument to the level and to the proper height, to bring the needles to the same position as the needles of the compass-card, when the bowl is in its place.

The binnacle with the arrangement of correctors for correcting the semicircular, quadrantal, and heeling errors, is shown in Figs. 9, 10, and 11. *MM* are the receptacles for the fore and aft magnets; *M¹ M¹* are the receptacles for the thwartship magnets; and *H* is the Flinders bar. In Fig. 10 the dipping needles instrument is shown hanging in its place in the binnacle.

The binnacle contains mechanical appliances for realizing in practice the principles of correction discovered and published originally by Captain Flinders and Sir George Airy. The correctors for the several parts of the compass error¹ are as follows:—

To correct the “quadrantal error,” a pair of unmagnetic iron globes (solid or hollow), fixed on each side of the binnacle.

To correct the “semicircular error,” bar-magnets in symmetrically placed long horizontal² holes thwartship and fore-and-aft within the binnacle, and a Flinders bar (described below) attached to the binnacle outside on the fore or aft side.

To correct the “heeling error,” three, two, or one bar-magnets in a brass can hung by a chain, by which it can be moved up and down and secured in any position in a brass tube fixed in the centre of the binnacle, under the compass-bowl.

The part of the heeling error which depends on magnetism transiently induced by the vertical components of the earth’s magnetic force, is always partially and may be wholly corrected by the globes and the Flinders bar. The heeling error on the east and west courses is wholly corrected by the Flinders bar.

The corrector-magnets regularly provided with the binnacle for the 10-inch compass are round bars of glass-hard steel, 9 inches long and $\cdot 4$ of an inch or $\cdot 2$ of an inch diameter. Each magnet is painted blue in one half of its length and red in the other half, according to a happy suggestion of Sir George Airy’s; blue to mark the end possessing the same kind of magnetism as the earth’s north polar regions, and red to mark the end possessing the same kind of magnetism as the earth’s south polar regions.³

The fore-and-aft corrector-holes (shown at MM, Figs. 9 and 11) are in two vertical rows or scales, at equal distances of about 5 inches from the middle of the binnacle. The thwartship corrector-holes are

¹ Error of the compass” means the angle between the north and south line of its card and the correct magnetic north and south line. The error is said to be easterly when the north point of the card lies to the east of magnetic north, and westerly when it lies to the west of magnetic north. This use of the word error has official sanction in the Admiralty Manual, Section IV, in respect to the “heeling error.” The word deviation is also used in other parts of the Admiralty Manual to signify the same as error, but the word error seems to express the meaning better, and has the advantage of being of two syllables instead of four. Some writers have defined error as the angle between the north and south line of the compass and the astronomical north and south line: but this definition conveys an altogether wrong idea of what the compass ought to do, and is not in any respect convenient. All confusion is avoided by adhering to the simple definition of error given above.

² The words “horizontal” and “vertical” with reference to fixtures in the ship, are used for brevity to denote positions which are horizontal and vertical when the ship is on even keel.

³ The blue ends are properly called “true north poles,” and the red “true south poles,” but (because of the law that likes repel, and unlikes attract, in magnetism) the true north pole points south, and the true south pole north, if a bar-magnet is hung horizontally by a thin thread, and therefore English instrument makers (still unmoved by Gilbert’s protest 250 years ago) mark the true north poles S, and the true south poles N. All ambiguity is removed in a particularly convenient manner by the Astronomer Royal’s blue and red marking.

in one vertical row (shown at M' M', Figs. 10 and 11), about the same distance forward or aft from the centre of the binnacle. The holes in each vertical scale are spaced to give equal augmentations or diminutions of corrective force, when one of the corrector-magnets is shifted up or down from hole to hole in order. They are marked with numbers proportional to the corresponding corrective forces.

One of the corrector-magnets, when held horizontally with its two ends equidistant from the centre of the compass, exerts forces on the ends of the needles in lines parallel to its own length, and in opposite directions on the two ends of each needle. These forces, transmitted through the silk bearing threads, pull the north point of the card towards the side on which the blue end of the corrector is held. Hence a pull¹ to port or to starboard is produced by a magnet in one of the thwartship corrector-holes, with blue end to port or to starboard: and a pull forward or aft, by a magnet in one of the fore-and-aft corrector-holes, with its blue end forward or aft. With magnets already in some of the corrector-holes, if a pull to port is wanted, it is had by raising one of the bars in the thwartship scale, if its blue end is to port, or lowering it or removing it or reversing it if its blue end is to starboard; and if a pull forward is wanted, it is had by raising a magnet in one of the fore-and-aft scales, if its blue end is forward, or lowering or removing or reversing it if its blue end is aft.

Westerly error² when the ship's end is north, or easterly error when the ship's head is south, is to be corrected by a pull to starboard.

Easterly error when the ship's head is north, or westerly error when the ship's head is south, is to be corrected by a pull to port.

Easterly error when the ship's head is east, or westerly error when the ship's head is west, is to be corrected by a pull aft.

Westerly error when the ship's head is east, or easterly error when the ship's head is west, is to be corrected by a pull forward.

When the globes for correcting the quadrantal error have been once properly placed, no change of this adjustment is ever necessary for the same ship, and the same position of the compass in it, except in the case of some change in the ship's iron, or iron cargo, or ballast, sufficiently near the compass to sensibly alter the quadrantal error. But the magnetic correctors for the semicircular error and the heeling error must be adjusted from time to time, to keep the compass correct.

The Flinders bar supplied with the compass is a round bar of soft iron, 3 inches in diameter, and of whatever length of from 6 inches to 24 inches is found to be proper for the actual position of the compass in any particular ship. To make up the proper length it is supplied in pieces of 12 inches, 6 inches, 3 inches, $1\frac{1}{2}$ inches, and two pieces of $\frac{3}{4}$ of an inch. In making up the proper length the longest piece should be uppermost and the others below it in order of

¹ A pull to port or to starboard, or a pull forward or a pull aft, is a short expression for a magnetic force pulling the north points of the compass-card to port, or to starboard, or forward, or aft.

² The error is called easterly, when the north point of the compass-card is on the east side of the correct magnetic north and south line; westerly, when on the west side of this line.

their lengths. The weight of the bar is supported on a wooden column or bar, resting on a pedestal fixed to the binnacle near its foot, this wooden bar being cut to such a length, or so made up of pieces, as to give the proper height to the upper end of the iron bar. The compound column of iron and wood is kept in position and protected from rain and spray by a brass tube, with upper end closed, going down over it.

The main object of the Flinders bar is to counterbalance the component of the ship's horizontal force on the compass, which is due to magnetism induced by the vertical component of the terrestrial magnetic force. Hence, in all ordinary cases, the ship's iron being symmetrical on the two sides of the fore-and-aft midship vertical plane, and the compass being placed in this plane, the Flinders bar must be placed in it also, and therefore must be exactly in the middle of the front side, or of the after side, of the binnacle. The Flinders bar essentially corrects, wholly and permanently, the constituent of the heeling error, which has its maximum values on the east and west courses. A subordinate object of the Flinders bar, as supplied to my compass, is to partially correct the constituent of the heeling error, which has equal maximum values on the north and south courses, by partially counterbalancing the component force on the compass, perpendicular to the ship's deck, exerted by that part of the ship's magnetism which is induced by the vertical component of the earth's magnetic force. For this object also the proper position of the bar is up and down in the middle of the forward or after side of the binnacle; but for it the bar should be lowered a little below, or raised a little above, the position in which, without altering the length of the bar, it gives its maximum horizontal force on the compass. When it is not desired to make this contribution to the heeling correction by the Flinders bar, it should be placed with its top about 2 inches above the level of the needles of the compass-card.

To understand the action of the Flinders bar, suppose first the ship to be anywhere in the northern magnetic hemisphere.¹ The vertical force there is such as to pull the red end or pole of a magnetized needle downwards, and to repel the blue end upwards. It also has the effect of inducing magnetism in any mass of iron, so as to give it a transient magnetic quality marked with blue on the upper side or end and red on the lower side or end. Thus, in the northern magnetic

¹ The earth's surface is divided into two parts, called the northern and southern magnetic hemispheres, by a line called the magnetic equator, which is the line of no dip. This line is not a great circle like the true equator, but a sinuous line north of the true equator in all east longitude, and from 180° to 173° of west longitude; and south of the equator in all west longitude less than 173° . Its greatest distance on either side of the equator is where it cuts the coast of Brazil in about 17° south latitude. Its greatest distance north of the equator is in the Indian Ocean, which it crosses from Africa, a little south of Cape Guardafui, to the south of India, very nearly along the 10° parallel of north latitude, and eastward across the mouth of the Bay of Bengal to the Malay Peninsula, still but little short of this degree of north latitude. A chart of lines of equal magnetic dip, such as the very convenient small scale one of the Admiralty Compass Manual, should be carefully studied.

hemisphere the Flinders bar is transiently magnetized by the earth's vertical force in such manner that it acts like a great bar-magnet with its upper end blue and its lower end red. At the magnetic equator it loses its magnetism, and in the southern magnetic hemisphere it acquires magnetism in the opposite direction to that which it had in the northern hemisphere; so that now its upper end is red and its lower end blue. As the ship moves from one hemisphere across the magnetic equator to the other, the magnetism of the Flinders bar gradually¹ diminishes to zero, and then increases gradually in the contrary direction. The object to be attained in applying it to the binnacle is that, with this gradual change of its magnetism, it shall always as exactly as possible counterbalance the changing part of the force on the compass, due to the part of the ship's magnetization which changes with the gradual change of the vertical component of the terrestrial magnetic force. If this changing part of the ship's disturbing force on the compass is a pull aft in the northern magnetic hemisphere, and a pull forward in the southern magnetic hemisphere, the Flinders bar must be on the forward side of the binnacle. On the other hand, if the regularly changing part of the ship's force be a pull forward in the northern hemisphere, and aft in the southern hemisphere, the Flinders bar must be on the after side of the binnacle. The former is the most frequent case for the chief navigating standard compass and for the steering compass of modern mail steamers and merchant steamers generally, in which the steering and conning of the ship is done on a bridge forward of the engines, with considerably more than half of the ship behind it. It is also almost certain to be the case for an after steering compass, a few feet in advance of the top of the iron stern-post and rudder-head, in an iron steamer or sailing ship. The second above-mentioned case is what will generally be found for a compass anywhere in the after half of the ship's length, to within two or three yards of the stern-post. Most frequently it is not possible to ascertain which of the two is the actual case until the ship has made a voyage through regions presenting considerable differences of vertical magnetic force. The best plan generally is, in first placing the binnacle on the deck, to turn it with the fittings of the Flinders bar forward or aft, according as it is found that the fore-and-aft correcting magnets have to be placed with red or blue poles forward or aft. It may be that the experience of a first voyage may show that the binnacle must be turned the other way to get the Flinders bar into its right position; but the chance of this being necessary is less if the binnacle is first placed according to the preceding rule, than if it is placed in the opposite direction without some knowledge to guide. If it has to be turned, the turning is done in a few minutes, for any binnacle made after January, 1880, as the binnacle has four feet, which are screwed by brass bolts to brass sockets fixed in the deck, and fitting for either side of the binnacle foremost.

In the first adjustment, or as long as there is special knowledge as

¹ The change of polarity in vertical bars in the ship, which takes place in crossing the magnetic equator, has sometimes been falsely supposed to be abrupt, and mistakes in respect to compass courses have been made in consequence.

to the proper proportion of correction to be made by the Flinders bar, it may be set to correct about half of the whole error on the E. and W. courses; the remainder must be accurately corrected by the fore-and-aft magnets.

Suppose now the first adjustment to have been made somewhere in the northern magnetic hemisphere, and suppose that as the ship goes to places of weaker vertical force¹ the fore-and-aft correcting force required to make the compass correct on the east or west points, is found to be less than at the beginning of the voyage. It is clear that part of the correction made by the magnets ought to have been made by the Flinders bar. But nothing need be done except to diminish the fore-and-aft pull by the magnets, as long as the ship is going to places of weaker vertical force. If without touching or crossing the magnetic equator the ship returns again to places of stronger vertical force, and if it is found that increased longitudinal pull is now required, this should be applied, not by the magnets, but by introducing a Flinders bar or by increasing the bar already in position.

Generally, for a ship making passages to and fro through regions of considerably different vertical force, whether she crosses the magnetic equator or not, the rule in respect of the fore-and-aft correction is as follows:—

Correct the deviations found by observation on the east or west courses by the fore-and-aft magnets when the ship is going to places of weaker, and by the Flinders bar when she is going to places of stronger, vertical force, whether in the southern or northern hemisphere.

After a few voyages the proper proportion of correction by Flinders bar to correction by bar-magnets will be practically realized.

Commander CURTIS, R.N.: There are one or two points I should like to mention. A friend of mine, a navigating Officer, once told me that he was on board one of our turret ships, and they went out to try her at Spithead. The compass had already been adjusted, but after firing they found the compasses were all wrong. I should like to ask if the concussion of the guns would alter the magnetism of the ship? Sir William Thomson tells us how sensitive the poker is to the slightest tap, and possibly the concussion of our heavy guns, especially being so near the turrets, might alter the magnetism of the ship. I have not been afloat in any ironclad, but I naturally take an interest in the profession, and should like to know how that is. The last time Sir William Thomson spoke with respect to the compass, I wanted to confirm what he said with respect to the blue and the red denoting the *proper* true north and south poles respectively. A merchant Captain, in 1864, in command of one of these improved ships, with an iron deck and everything that could possibly be

¹ "Vertical force" is a short expression for the vertical component of the earth's magnetic force. It is reckoned as positive when the direction of its action upon a red pole is downwards, as in the northern hemisphere; and negative when upwards, as in the southern hemisphere. At the magnetic equator it is zero. The amount of the vertical force at any place is calculated by multiplying the value of the horizontal force given by the chart of lines of equal horizontal force of the Admiralty Manual by the tangent of the dip as given by the chart of lines of equal magnetic dip. Thus, for example, the tangent of the dip for the south of England being 2°44, and the horizontal force there being called unity, the vertical force there is 2°44. The tangent of the dip at Aden is °09, and the horizontal force there is 1°95; hence the vertical force there is ·1755, or about $\frac{1}{4}$ of the vertical force at the south of England.

made of iron, on board the ship, was going from the Tyne to Coquimbo, bound round the Horn. The compasses were adjusted, and I presume that he in his happiness thought they would be all right to take them to Coquimbo and back again. But, unfortunately, when he got off the Horn, his chronometer went down, and he tacked always within eight points of the compass. He could not understand it: he put his helm up and ran into soundings, and he literally felt his way into Rio with his deep-sea lead, and he said if he had been at sea another week he would not have had a man left, they were so exhausted. I do not know what the Board of Trade Regulations are with respect to the examination of merchant Captains and mates, but I think they should insist that upon the fly-leaf of every log-book, some simple instructions should be given for the correction of the compasses, and also stating for the benefit of the Captains, if they do not know it, that when they have crossed the Line, the magnet acts just in the reverse way. One would hardly think that there are any merchant Captains who do not know it, but this man certainly did not in 1864. The particular point I wish to ask is whether the concussion caused by firing the guns will alter the whole magnetic attraction of the ship?

Captain SAMUEL LONG, R.N.: I do not feel equal to following Sir William Thomson over the beautiful invention which he has just explained to us: but I must confess that I am very grateful to him for his goodness to the naval profession and the maritime profession at large. I am sure that many now cruising about the ocean would agree with me in saying that. I should like to ask Sir William Thomson if he could give us any practical results by naval men or merchant Captains as to the azimuth mirror for taking bearings, whether it has been found to be practically satisfactory and superior to the old Admiralty plan. Also whether the disturbance of the firing of guns on the compass, has been satisfactorily met? The other day I was on board a new steel steamer—one of the newest steamers built—8,000 tons. I said to the Chief Officer, "What compass have you got?" He said, "We have got Sir William Thomson's." I said I thought it was very costly and difficult to manage. He said, "Oh, no, it is as simple as A B C; we never 'have any bother at all; it is always correct, and we never have the slightest trouble.'" I think that information from a practical man, who is constantly at sea, is worth a great deal more than anything I could say.

Lieutenant CHARLES CAMPBELL, R.N.: Without presuming to discuss the able paper to which we have listened, I may be allowed to say that I served two years on board the "Minotaur," which had Sir William Thomson's compass. We found it most valuable in alterations of course of eight points, and, in fact, during all manœuvres. The compass as she came up would settle exactly on the point. The improvements of which we have heard to-night seem to me of the greatest value, and I think if Sir William Thomson has given to the Navy a compass that will stand when the guns are in action, and be true to the Pole, he will have done as much for the Navy as if he had discovered the Pole itself.

Staff-Commander CREAK, R.N.: Being particularly interested in the compass question on board ship, I propose to make a few remarks on the subject before us. Whilst explaining the construction of his instrument for correcting the "heeling error" on board ship, Sir William Thomson has laid much stress on the importance of knowing, or being able to estimate, the value of what is known as λ (lambda), in the notation of the Admiralty Manual. He has given us various estimates of its value from '6 to '95, according to class of ship. Some of those present to-night may not be aware that the Admiralty system more fully recognizes the value of λ by not merely trusting to its being estimated, but by ensuring its being ascertained by actual experiment for every class of vessel in the Navy. The value of the vertical force, or μ (mu) of the Admiralty Manual is also ascertained in every ship. Sir William Thomson also referred in his remarks to the vertical force of ships. His remarks are perfectly clear on the subject, except in one respect, namely, that the vertical force is generally downwards. Perhaps, Sir William Thomson has not the same advantage that I have in knowing the magnetic character of every ship of the Navy. The vertical force in Her Majesty's ships is more generally upwards, from the fact, that the ships built in our own dockyards are, in most part, built with their heads in a southerly direction. The ship's stern is, therefore, magnetized with red magnetism; therefore the vertical force acts upwards, and that, meeting the downward pull

caused by the soft iron of the ship, is in great measure counteracted. I am now speaking of ships such as the larger ironclads (not turret ships), the "Northampton," and similar vessels. Sir William Thomson kindly referred to a paper of mine, that was read before the Royal Society on the question of the effects of the iron masts in the "Undaunted" on her compasses. Although in that case the effects were very important, I do not think it was the cause of the upward force of the "Northampton," because she was built at Elder's yard, on the Clyde, with her head in a southerly direction, and according to the usual effect of the earth upon a ship in such a position, the after part of a ship, where the compass is placed, would receive red magnetism, and the vertical force act upwards; but had her compasses been brought near her masts, the upward vertical force would have been very great. The effect of the masts was so great in the case of the "Undaunted," that we had to correct the binnacle compasses by vertical magnets, a thing which has never been done before in a wooden frigate. Sir William Thomson spoke of the large changes of ships going to the Cape, and he very truly said, the Flinders bar was a good thing in correcting that error. He has referred to ships having errors of 30° or 40° . I know of an instance communicated from the Board of Trade, in which there was an error of 40° in a vessel's compass there, which had been correct in Sunderland; but then one must consider, the compass was not placed according to knowledge. It was placed near the stern, and there, of course, it was too near a vertical enormous Flinders bar—the stern-post, a bar affected by the vibration of the ship. The result was, she changed as much as 30° to 40° . But in our ships, where the compasses, I may say, are placed according to knowledge, the changes are remarkably small. Take the "Volage," for instance. The "Volage," in going from England to the Cape, scarcely altered at all. The change from the transverse force was only 2° . The part that would be expected to change most was from the fore and aft magnetic force, but that only changed $1\frac{1}{2}^\circ$. That, I conclude, resulted from the judicious position in which the compass was placed; and, therefore, in that case, the Flinders bar would have been of no use. But I can see the use of it when people who build ships will insist on putting their compasses in any place, just as it happens to suit their convenience. There are a few of our ships which have not been so satisfactory lately as the "Volage," the ships of the "Gem" class. The deviations in these ships in going from England to the Cape, have altered as much as 8° to 9° , and, perhaps, there a Flinders bar might have been useful; but not to the same extent that Sir William Thomson has found in merchant ships. Another subject which has been referred to, is the question of firing guns. That has been thoroughly gone into, and the result on iron of firing guns is similar to what you have just seen with the poker. If you put the compass on a thin iron structure, as it is necessary to do in our turret ships, firing guns continually alters the magnetism of that thin iron structure, producing new errors in the compass so placed, and nothing can help it—no Flinders bar or any other magnetic corrector can prevent it, and I should be very glad if anyone will find some system of meeting the difficulty. No man of science has ever brought forward any proposal for preventing the magnetism of iron being altered by concussion from whatever cause. The ships that have altered most have been those of the "Thunderer" class, and we expect it. The Captains of these ships are warned accordingly, and especially so. The navigating Officer is the Officer who has most time to attend to these things, and whose especial duty it is to look after the compass—that compass may be made perfectly correct, and yet after firing, or perhaps, if the ship has been lying in any direction for a certain length of time it is quite enough to temporarily alter the magnetism of the ship. I do not wish to detract in any way from the merits of the compass on the "Minotaur's" poop, which has been mentioned to-night, as it does its work efficiently; but there is nothing whatever to prevent a compass of the Admiralty pattern being put on the poop of the "Minotaur," and being made equally correct to that of Sir William Thomson. In saying this, I wish to point out that we are not behindhand in the Service, but have every means at our disposal for making a correct compass for tactical or other purposes.

Sir WILLIAM THOMSON: Captain Curtis asked a question which has been very clearly answered by Captain Creak. I may add that the "Glatten" showed that effect very remarkably, on the occasion of the particular service squadron under

Sir Cooper Key, going from Portland to Portsmouth for the Naval Review in 1878. While steaming out of Portland, my compass on board the "Glatton" was found to be quite correct on all points. Then, by order of the Admiral, the "Glatton" steamed out of position in order to have some trials of the compass under gun-fire. The question as to the steadiness of the compass was satisfactorily answered. The compass remained perfectly steady, and was quite serviceable during the firing of the heavy guns. The question of the effect of the concussion produced by the firing upon the magnetism of the ship was also gone into, and I found an easterly error of 5° when the ship turned to north, immediately after the gun-firing on an easterly course. After a little steaming on various courses, at ordinary speeds, this error became much diminished, if not annulled, in the course of half an hour.

Captain Creak: The compass, when it has been altered by gun-firing, as a rule takes some days to relapse into its former position, but it does relapse gradually.

Sir WILLIAM THOMSON: It is not to be supposed that any *automatic* appliance can be placed on board ship which will cause the compass to point always correctly. My object has been to cause the compass to point correctly by means of adjustment and readjustment performed methodically, by a safe and easy process, when found necessary. The navigator must always be on the watch, to examine the compass and allow for any error he finds. Small changes that may be transitory may be left to themselves, but changes which show themselves week after week, persistently, should be corrected by a slight readjustment of the correctors. Captain Long asked if the azimuth instrument has been found practically satisfactory? I may answer that question by saying, referring to a very satisfactory report communicated to me some time ago, by the British India Company, having been received by them from Captain Smith, of their steamer "Malwa," which has had a compass of mine on board. The previous Captain had left no record of the errors of any of the compasses, except on the courses actually steered, and Captain Smith joined the ship at a port (Busreh) at the head of the Persian Gulf. With a compass that he had never seen before he naturally felt uneasy, because he was going on different courses to those for which he found the compass errors recorded; and he had absolutely no guidance as to what errors might be expected on the course he had to steer, but he had read my book of "Compass Instructions" during the few days he was in port. Happily, after getting out of port he had clear weather, which allowed him to take bearings of the Polestar with the azimuth mirror. One important quality of the azimuth mirror is the exceeding ease with which it can be used at night, for stars, even in a heavy sea, with considerable rolling and yawing of the ship. Captain Smith corrected the compass by the magnets, according to the printed instructions, in about an hour. He then put the ship a second time round, and verified that there was no error, and after that he went on his course with full confidence.¹ He reports that ever since he has had no difficulty in keeping the compass perfectly adjusted at sea. The azimuth mirror has been very extensively used in the merchant service. Captain Lecky, now of the British Shipowners' Company, has taken a great many star-azimuths, and reports that he is very much pleased with the results. Captain Long also asked if the performance of the compass was satisfactory during firing? It been perfectly satisfactory in the "Northampton" and in the "Glatton." I have seen it, also, in firing salute-guns in the "Euryalus," and the result has been perfectly satisfactory.

Staff-Commander CREAK: May I be allowed, Sir, to add a little to the remarks I have already made, by saying that in any remarks I have made with regard to Sir William Thomson's compass, I hope that the meeting will consider I am not casting any reflection upon it. That compass is now on trial in the "Northampton" by order of the Admiralty, and I am sure it will receive every possible attention and fair play. We shall be glad to hear that it has answered its purpose in every possible way.

Captain CURTIS: I think we understand Sir William Thomson to say that this

¹ "I had done in one short hour on a dark night with this new compass what would have been simply an impossibility under the same circumstances to have done with an ordinary compass."—Extract from report of Captain H. B. Smith, dated Calcut, Feb. 15th, 1880, to the British Indian Steam Navigation Company.

compass will resist firing. That is just what we are told the Admiralty want—a compass which will not be out of order during firing or after.

Sir WILLIAM THOMSON: My compass gives perfectly steady indications during firing; but whatever change takes place in the ship's magnetism by firing, is shown in my compass as in every other compass. Other compasses, however, may be so severely shaken by the concussion of firing, as to break the point or cap; and it is not safe to leave them in position. One great object I have aimed at has been to provide a compass which need not be lifted off the bearing-point during firing, and which can be used for navigation of the ship during gun practice or in action.

The CHAIRMAN: There is one remark made by Sir William Thomson which I think all those who have to navigate ships should lay to heart, and that is, that notwithstanding all his ingenious arrangements and improvements of the compass, he dwells upon constant observation, constant care, and constant watchfulness, to see that the errors are corrected. I have heard that that is not, perhaps, so much attended to as it should be in the merchant service. The Officers of that service too often have their compasses corrected by experts at home, and pay very little more attention to the matter. It is manifest, that whatever may be the ingenuity displayed in correcting compasses, nothing can supersede careful observations. I think we are all deeply indebted to Sir William Thomson, a man of high scientific attainments, for coming here this evening, and explaining this very interesting instrument. We have heard a most instructive paper, and hope, as Captain Creak has expressed it, that the compass now on trial may prove as great success as Sir William Thomson wishes it to be. With your approval I will return our grateful thanks to Sir William Thomson for his very valuable paper.

Friday, May 14, 1880.

VICE-ADMIRAL W. G. LUARD, C.B., Member of Council, in the
Chair.

TACTICAL ASPECT OF THE UTILIZATION OF OCEAN STEAMERS FOR WAR PURPOSES.

By Captain SAMUEL LONG, R.N.

1. HER MAJESTY'S NAVY,¹ whereon, under the good providence of God, the wealth, safety, and strength of this kingdom chiefly depend, is designed to maintain our supremacy afloat by guarding the seaboard of the British Empire from attack by an enemy, and protecting our commerce on the high seas, and our interests in foreign lands. It may be divided for our present purpose into armoured and unarmoured ships.

2. The "mercantile" fleet is the offspring of private enterprise, and is built and sailed with a view to the profit of the owners.

It may be roughly divided into sailing and steam cargo ships, and high speed mail and passengers steam ships.

The following figures show the proportion per cent. of total tonnage in steam ships:—1854, 5.05; 1860, 9; 1865, 12.6; 1870, 17.9; 1875, 32.0; 1879, 39.4.

In view of possible future developments of our "mercantile" marine, I quote Mr. Froude's deduction given in his paper on "useful displacement" at the Institute of Naval Architects.

"Whether we enlarge a ship by increasing her three dimensions throughout in the same given ratio, or whether we enlarge her by increasing her length alone, the ratio in which the structural weight would be increased is the fourth power of the ratio in which the dimension is enlarged." . . . "Enlargement by elongation is inferior to general enlargement, unless some great increase of speed is contemplated." Also, in his letter to the "Inflexible" Committee, wherein Mr. Froude shows that increasing the beam of such a vessel 27 feet on the same other dimensions and draught with finer ends, would produce very small increased resistance.

Table I shows the ships and colonies possessed by the principal nations of the world and the navies maintained. For comparison the corresponding numbers for this country in 1804 are shown.

Table II shows the number of large steam ships owned in this country, and by foreign nations.

Table III shows a selection of typical vessels, "naval" and "mercantile."

¹ Naval Discipline Act, 10th August, 1866. 29 and 30 Vict., c. 109.

TABLE I.

Nation.	Population in millions.	Colonies.		Mercantile marine				Navy.		Ditto, for attack or defence of commerce.		
		Area. Square miles.	Population.	Sailing, over 50 tons.		Steam, over 100 tons.		Armoured.	Unarmoured.	3,000 tons or over.	1,700 and 2,500.	Under 1,600.
				No.	Tons.	No.	Tons.					
United Kingdom in 1804.*	18?	..	..	About 4,900	905,000	..	..	Ships of line. 475	Others. 4281	From 50 guns down, over 500 tons. Over 1,000 47	1,700 and 2,500. 30	Under 1,600. 107
Ditto, 1879.....	33	7,647,000	204,172,953	18,357	5,584,128	3,542	3,933,966	49	247	11	30	24
France.....	38	335,629	3,654,056	2,914	572,506	292	356,636	51	113	3	22	21
United States.....	33	..	..	5,915	2,041,645	519	601,289	20	63			
Germany.....	43	..	..	3,159	927,984	244	265,383	22	59			
Russia.....	86	..	..	1,852	425,090	156	119,937	27	139	7	3	7
Italy.....	27	..	..	2,956	924,797	101	100,047	16	38	1	2	3
Spain.....	17	113,678	6,399,347	1,589	328,681	214	178,144	10	63			
Austria.....	37	..	..	608	238,347	74	81,901	14	37			
Netherlands.....	4	665,700	24,386,991	1,144	340,093	113	120,711	17	48			
Portugal.....	4	709,469	3,258,141	429	99,917	16	15,237	1	23			
Denmark.....	2	87,124	127,401	1,180	180,589	101	71,656	7	21			
Turkey.....	16	..	..	284	48,437	28	27,763	33	45			
Sweden and Norway.....	7	..	..	6,099	1,786,639	329	143,885	8	62			
Belgium.....	5½	..	..	27	10,809	31	54,924					
South America.....	16	..	..	271	94,894	80	56,222	27	70			
Total of the world..				49,024	14,103,605	5,897	6,179,985					

* In 1804 there were, on Lloyd's List, 15,100 vessels and 26 East Indiamen; of these, 148 were over 500 tons B.O.M., and 47 over 1,000 tons B.O.M. The largest vessel on the List was 1,952 tons.

In 1809 it was estimated that one half the floating property was insured at Lloyd's, and during war time (1782) the rates of insurance varied from 30 to 20 per cent., reduction made for convey of 16 to 8 per cent.—Mr. Martin's "History of Lloyd's."

In commission.

TABLE II.

Iron screw steamships, where owned.	No. of steamers.		Total.	Remarks.
	Over 1,900 gross register, or 3,000 tons displacement.	Over 2,900 gross register, or 5,000 tons displacement.		
British and Colonial ..	M. 344	N. 147	491	Of foreign type M, 77 were built in England, 10 are paddle.
Foreign	128	80	208	Of British N type, 3 are paddle.
Total	472	227	699	Of foreign N type, 39 were built in England, 2 are pad- dle.

The above from "Bureau Veritas," 1880. Only one twin screw on list.

Mr. Barnaby, 1877. 300 steamers capable of going 12 knots for 6 hours.

Mr. Donald Currie, 1880. Believes 80 fit for Admiralty requirements.

Mr. Ravenhill, 1877. By his list 76 of type M and 82 type N appear to be full powered.

3. From these data I conclude—

1st. That the Navy of to-day is far less numerous in proportion to the trade to be protected, than that of 1804 was.

2nd. That the average "man-of-war" is less capable of protecting contemporary commerce, than her predecessor of 1804 was.

4. Attention has lately been called to the possibility of our trade being attacked by swift merchant steamers armed and commissioned as men-of-war, hence the exact tactical value of such vessels is a matter of practical importance to naval Officers, and all others interested¹ in the protection of our trade.

5. A brief retrospect of the history of this question may be useful.

While both the "Navy" and "mercantile" fleets were built of wood, the first class merchant ship was armed during war, and fought successfully on many occasions.

In 1853 when iron steamers were rapidly superseding wooden ones, a joint Admiralty and Ordnance Committee sat to consider the suitability of merchant steamers for war.

They reported that iron vessels, *vide* No. 2, Table III, were unfit for war, but selected 16 out of 91 vessels inspected by them as suitable for the reception of a defensive armament to enable them to act as

¹ See "Proceedings," Institute of Naval Architects, 1876 and 1877, Mr. Brassey, M.P., and Mr. Barnaby, C.B.; also "Journal of the Royal United Service Institution," 1880, Mr. Donald Currie, C.M.G., M.P., No. CIV, p. 81, *et seq.*

auxiliaries to the Navy in war time. No 1, Table III, is an example of the type selected.

A Treasury Committee in the same year reported "that no expense should be incurred for the sake of giving a military character to the "postal vessels," and henceforward all reference to such a character disappeared from the contracts.

6. In what respect does the naval position of to-day differ from that of 1853?

On the offensive side, guns have increased in weight and power. Two weapons easily portable by merchant ships have been introduced, the ram and torpedo. On the defensive side, our "men-of-war" of the unarmoured type are now largely dependent on watertight compartments and coal armour, and are principally constructed of iron and steel.

These improvements have likewise been applied to merchant ships. The most serious objection to the use of merchant steamers for war, has always been the exposure of the engines and boilers to hostile shot.

7. As soon as experiment had demonstrated the capacity of coal with iron plates $\frac{3}{8}$ inch thick inserted loosely, to stop shot and localize the effect of bursting shell, this objection was in great part removed.

The experiment of 1878 proves that an energy of about 87 tons per inch shot's circumference is insufficient to perforate 11 feet of bunker with three loose plates spaced 2 feet 10 inches apart, and that shells with large bursting charges are equally inefficacious.

It does not show what energy would suffice for perforation, nor the probable effect of a broadside of shells.

In passing, I observe that it seems possible that horizontal bars, or tubes connecting the loose plates, and thus transmitting the shock of impact to a larger surface of loose coal, might render this kind of protection even more efficacious.

8. The tactical aspect of our situation afloat is constantly varying, and the point of view can only be compared to that of a traveller passing through a landscape at speed. The progress of invention may at any moment introduce new and paramount considerations.

It is therefore necessary first, to define carefully the vessels and weapons which we are to consider.

9. A general comparison of merchant steamers, and "men-of-war" steamers shows that—

As regards mobility, only first class cruisers equal in speed, and that only at full power, the steamers of the Atlantic and Australian lines; the latter also possess greater coal endurance. On the other hand, "men-of-war" have greater sail power, and their sheathing enables them to keep the sea without docking, for a far longer time than an iron steamer.

As regards defensive power, in its normal state the merchant steamer is very vulnerable. The steering wheel of steamer A is 17 or 18 feet above the water-line and the rods carried along the gutter ways.

The tops of the cylinders in steamer A are some 9 feet above the

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TABLE II.

Distinguishing No.	Description of vessel. Date of launch. W, Wood. I, Iron. S, Steel.	Dimensions in feet.					Sail power.			Propeller.	I.H.P.	I.H.P., coeff. for comp.
		Length at L. W. L.	Beam ditto.	Mean load draught.	Displacement.	Ditto available for coals and cargo.	Rig.	Sail area.	Coefficient of comparison.			
1	"La Plata," W., 1851.....	280	37½	20½	4,207	..	..	..	..	Paddle	1,000 nom.	..
2	"Indiana," I., 1852	254	38¾	18½	3,662	..	..	..	..	Screw	300 nom.	..
3	"Alabama," W., 1862	230	32	15	1,575	..	Barque	..	..	Lifting screw	300	..
4	H.M.S. "Nelson," 1877	280	60	24½	7,473	..	Ship	24,770	64·8	Twin screw	6,624	17
5	Cape mail steamer, S., 1879	360	43	24	7,240	4,350	Brig	16,990	45·4	Single screw	3,156	8
6	Steamer A	360	43½	22	5,900	3,500	"	17,225	46·0	"	2,704	8
7	French mail steamer.....	393½	44	24	7,593	2,800	3-mast barque	17,545	45·1	"	3,284	8
8	Atlantic mail steamer, I., 1878	450	45	26	9,300	4,200	4-mast barque	21,725	49·0	"	6,500	14
9	Atlantic mail steamer "Britannic"	455	45	23½	8,500	..	"	..	..	"	4,900	11
10	Australian mail steamer, I., 1879 ..	445	46	26	9,400	4,500	"	23,450	52·7	"	5,595	12
11	H.M.S. "Iris," S., 1879	300	46	19¾	3,735	..	Barque	12,704	52·7	Twin screw	7,714	32
12	H.M.S. "Inconstant," I., wood-sheathed, 1868	337½	59½	23	5,962	..	Ship	26,655	82·8	Single screw	7,361	22
13	French first-class cruiser "Tourville," S. and I., wood-sheathed	327	50	22½	5,350	..	"	20,451	66·8	"	7,363	24
14	H.M.S. "Volage," I., wood-cased, 1869	270	42	20	3,320	..	"	16,593	74·4	"	4,500	20
15	French 2nd class cruiser "Villars," S. and I., wood-sheathed	249½	38	15¾	2,232	..	"	13,993	81·8	"	2,500	14
16	H.M.S. "Comus," S. and I., wood-sheathed, 1878	225	44	15½	2,383	..	"	13,746	77·0	"	2,300	12
17	French 3rd class cruiser, "Eclairer"	254	35½	14¾	1,617	..	Barque	13,519	98·0	"	1,900	13
18	H.M. King of the Netherlands "Atjeh."	262½	41	19	3,129	..	..	17,061	80	"	2,269	10
19	French mail steamer	330	43½	22½	5,206	1,755	3-mast barque	18,191	60·5	"	2,786	9
20	New type, Messrs. Short	280	40	19¾	4,133	2,310	Brig	..	..	"	1,000	3
21	"Daniel Steinman"	277½	34½	21	4,030	2,300	..	10,602	41·8	"	700	2
22	"Merkara"	360	37	16½	3,980	..	..	..	..	"	2,000	..
23	"Jaroslav," S. and I., wood-sheathed, building.	310	41	19½	3,150	..	..	..	..	"	1,560	6
											23,000	14

Nos. 4, 11, from "Proceedings, Institute of Naval Architects," Mr.
Nos. 7, 13, 15, 17, 18, 19, 20, 21, from "La Marine à l'Exposition U

TABLE III.

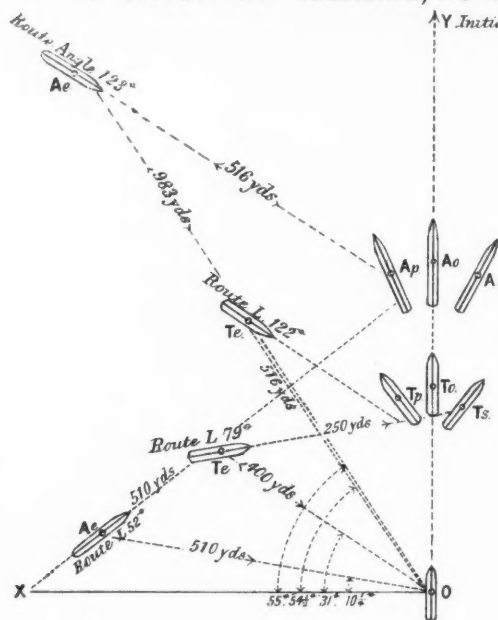
Steam power.						Armament.			Remarks.		
I.H.P.	I.H.P., coeff. for comp. $\frac{D^3}{D_1^3}$	Speed on trial.	Coal stowed.	Distance pass- able.		Can fire ahead.	Can fire astern.	Can fire abeam.			
				At full speed.	At 10 knots.						
1,000 nom.	..	13½	1,300	3,816 at regular speed.		1 8-inch, 65 cwt.	Proposed. 8 32-prs., 42 cwt.		1 8-inch, 65 cwt.	Consumed 100 tons per diem. Recom- mended. Consumed 36 tons per day. Rejected as iron. Confederate cruiser. Maximum speed ever attained, 13½ knots. Hull and engines, 4,047 tons; armour 1,720 tons.	
300 nom.	..	10½ mean	640	4,284 at mean speed.		Same scantlings as "Himalaya."					
300	..	11	All consumed going to Terceira.								
6,624	17·3	14	1,200	2,520	3,528 At 12½	800 lbs.	6 32-prs. Projectiles. 1,800 lbs.	800 lbs.		¹ Based on actual service. Greatest mean speed on 2,800-mile passage, 15·95 kts.	
3,156	8·4	13·9	1,250	7,500	11,100 about						
2,704	8·0 mod.	13·8	1,500	10,600	14,400						
3,284	8·4	14½	1,100	4,800	10,000					² Based on actual service.	
6,500	14·7	17·3	1,320	4,560 ¹	10,000 about						
4,900	11·7	16½	1,200	4,320 at 15 knots.	16,000 about						
5,595	12·5	15·54 mean	1,895	7,350 ²	16,000 about						
7,714	32·5	18½	750	1,730	6,800						
7,361	22·4	16½	680	1,504	3,000	2 6½-ton	10 9-inch 12-ton	2 6½-ton			
7,363	24·0	16·9	800	2,400	5,000	2 7½-inch	14 5½-inch 4 7½ "	1 7½-inch		Can fire 3 guns each side at 23° from keel.	
4,500	20·0	15·14	420	1,638	2,500						
2,500	14·6	15·5	400	2,418	5,000	2 6¼-inch	12 5½-inch	1 6¼-inch			
2,300	12·9	13	370	2,028	3,600					Cost 169,200£.	
1,900	13·8	15	210	1,530	3,500						
2,269	10·6	14·5	280	1,260	3,000	1 6½-inch	4 6½-inch 4 4¾ "	1 6½-inch			
2,786	9·2	14·4	970	4,900	10,000						
1,000	3·9	10·0	400	..	3,900						
700	2·8	10·9	250	..	4,690						
2,000	..	13·0	500	4,488						To be armed with 2 rifled mortars as well as guns.	
1,560	6·2	12·0		At 12 knots.							
23,000	214	215	..	..	..	..	..	..

architects," Mr. Barnaby, C.B., and Mr. White, 1880 and 1879.

l'Exposition Universelle," 1878.

Nº I.

TO ILLUSTRATE RAMMING, ITS DANGERS AND OPPORTUNITIES



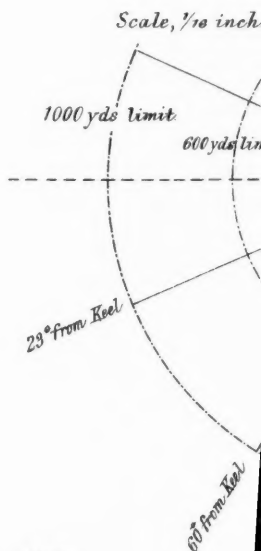
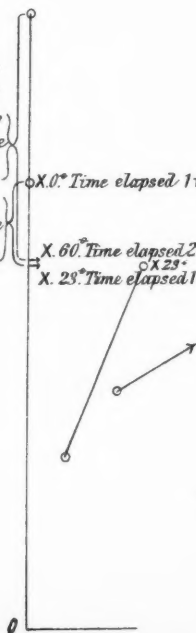
Y Initial Course.

Scale 1/8 inch = 100 feet

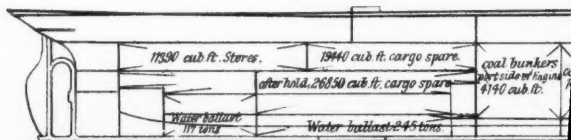
- T - H. M. S. Thunderer at 10.4
- To - No helm used.
- Tp - Ship turns to port.
- Ts - " " " " starboard
- Te - Hostile Thunderer at 10.4 k
- A - Atlantic Mail Steamer 445
- A o.p.s. - Same as other suffices
- Ae - Hostile Ram, 360 ft long, two
- O - Original position of centre of g
- Time interval 54 seconds.

Nº III.

- Loss of advance X. 60° 1105 feet
- Loss of advance X. 23° 345 feet
- X. 0° Time elapsed 1 m. 24 secs.
- X. 60° Time elapsed 2 m. 2 secs.
- X. 23° Time elapsed 1 m. 24 secs.



Scale 1/8 inch = 1 foot.



No V. COMPANION DIAGRAM.

Rever

IV. 17° , $66\frac{1}{2}$, $65\frac{1}{2}$

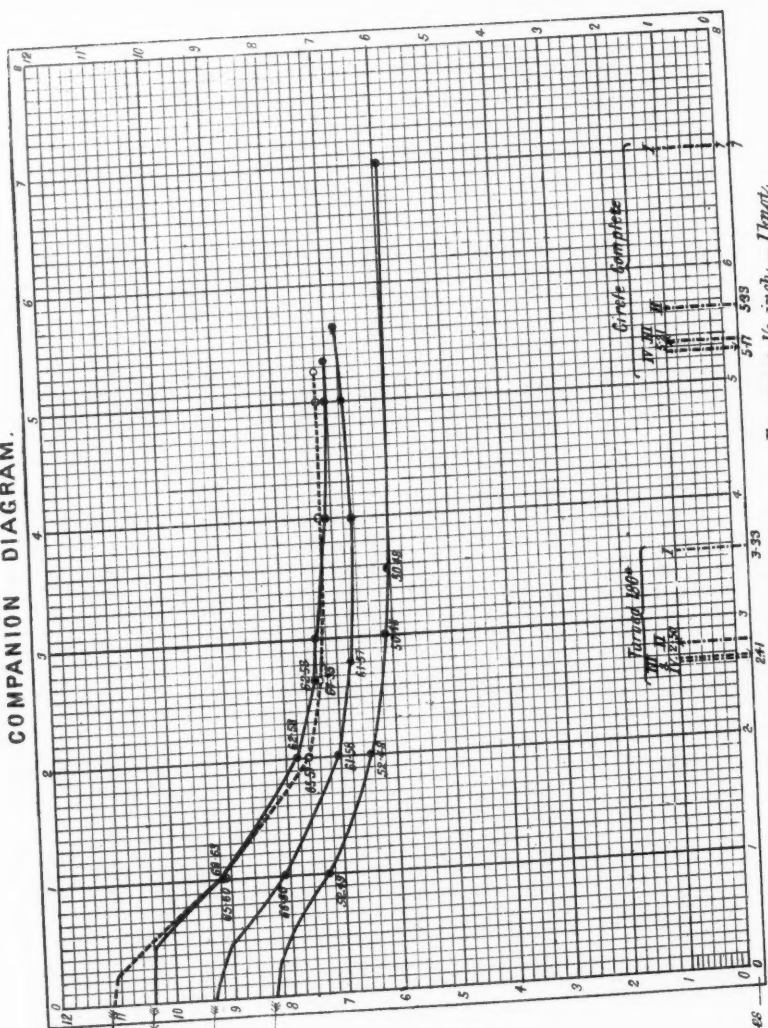
III. 16° , $65\frac{1}{4}$, $64\frac{3}{4}$

II. 14° , $65\frac{1}{2}$, 62

I. 0° , 55 , $50\frac{1}{2}$, 50

Initial Revolutions.

Angular Velocity, in uniform stage.



Time Base Minutes

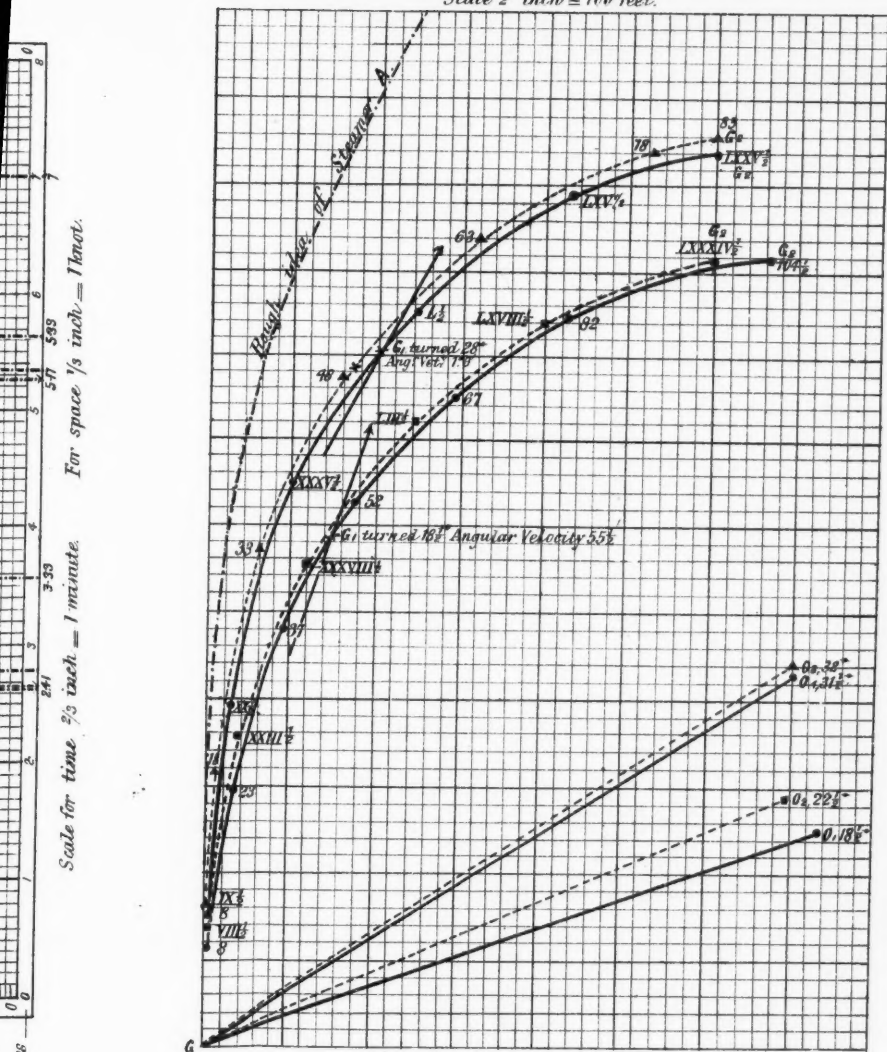
Scale for time $\frac{2}{3}$ inch = 1 minute.

For space $\frac{1}{5}$ inch = 1 knot.

N^o VI.

H. M. S. THUNDERERS FIRST QUADRANT.

Scale $\frac{1}{2}$ inch = 100 feet.



w
sl
s
in
t
R
f
M
c
c

water-line at 23 feet draught, for comparison those of Her Majesty's ship "Iris" are about 5 feet below the water line.

As regards watertight subdivision, while she possesses ample security for packet service, she is, as I shall show presently, deficient in that respect for fighting purposes.

As regards offensive power, steamer A with hull intact, could carry ten 6-inch Armstrong guns, and as Mr. Donald Currie has already pointed out, machine guns and torpedoes *ad libitum*.¹

We must then enquire—1st. Is such a vessel in her normal state fit for war? 2nd. Can such a vessel by modifications of an inexpensive kind introduced while she is building, be made fit for war?²

She is in the words of the poet, for her own purposes, "a goodly vessel such as laughs at all disaster, and with waves and whirlwinds wrestles."

But we must now enquire what effect the weapons of the day would have on such a structure.

10. The tactical value of an arm depends:

1st. On its effective command both as to arcs of fire and distance.

2nd. On its inherent power of destruction.

3rd. On the facility, or otherwise, for evading its blow.

There are four arms, the power of which must be briefly estimated in accordance with these principles.

11. 1st. The gun, and for my present purpose I shall deal only with the 6-inch Armstrong breech-loader, concerning which I have accurate information, and which has as flat a trajectory as any other, a point of supreme importance afloat.

All experience shows that at sea, firing is very inaccurate, and without entering into details, I shall credit this gun with an effective command of 1,000 yards, and for arc of training from 23° from the keel in one direction, to as much as can be got in the other.

Length.			Rifling.		Carriage and slide.
Extreme.	Of bore.	Of rifling.	No. of grooves.	Spiral.	
ft. in. 12 3/4	ft. in. 11 6	ft. in. 9 0/5	28	Increasing from 0 at breech to 1 in 40 at 7.5 feet from muzzle, remainder 1 in 40.	Of wrought iron; admit of 13° elevation and 8° depression. Length of slide between pivots 11 feet.

¹ See *ante*, Donald Currie.

² See last paragraph Sec. 17.

Ballistic Power.

Charge.	Projectile.	Velocity in foot seconds.		Energy per inch circumference foot tons.		Remarks.
		Muzzle.	1,000 yards.	Muzzle.	1,000 yards.	
33 lbs.	Chilled shell. 80 lbs. ¹	1,887	1,561	105	69.3	Will pierce 11-inch wrought iron plate at muzzle, an 8-inch plate on usual backing up to 250 yards.
33 "	Shell, 70 lbs. ²	2,000	1,617	103	67.6	
25 "	" 70 "	1,640				

¹ With 4 lb. 2 oz. bursting charge.² With 1 lb. 5 oz. bursting charge.*Weights.*

	Tons.	cwts.	qrs.	lbs.
6-inch gun	4	0	0	0
Carriage complete	1	6	1	10
Slide "	1	11	3	21
Racers, deck fittings, and securities	1	4	0	26
100 rounds ammunition	1	9	1	24
100 chilled shell and bursters	3	11	1	20
	13	3	1	17

We thus see that an armament of ten such guns placed on the upper deck of steamer A would constitute a weight of $81\frac{1}{2}$ tons with its centre of gravity approximately $38\frac{3}{4}$ feet above the under side of keel. Observe in passing, this vessel burns about 60 tons of coal per diem.

The space required for one of these guns lies inside an arc struck with a radius of $12\frac{1}{2}$ feet from the inboard edge of the gutter way, or 14 feet from the outer skin surface of ship.

24 feet of side would be required for each gun.

The ammunition, weighing in round numbers 51 tons, could be placed below. The rapidity of fire of this gun with a trained crew would probably be about one round in 40 seconds for 8 or 10 rounds.

Thus referring to heads of inquiry, our gun, which is intrinsically capable of throwing a shot 6,000 yards in 15.6 seconds, and of sending one 2,000 yards with a maximum height of trajectory of 62 feet, is owing to our numerous drawbacks afloat only credited with a practical effective command of 1,000 yards, beyond which distance, however, shrapnel with steel balls would doubtless do great execution. It has an arc of training of 118° .

It will at this distance perforate any part of a similar vessel except the prepared coal bunker, and even that at close quarters is not absolutely safe against its power with normal impact.

Its projectile cannot be evaded.

12. The next weapon claiming attention is the ram. The example of the "Arizona" charging an iceberg at full speed and yet surviving, proves the strength of such a vessel. At 16 knots, the blow represents a total kinetic energy of over 102,000 foot-tons, equal to the blow the shot of four 80-ton guns striking simultaneously would give. The bow was crumpled up as far as the frame immediately before the collision bulkhead, which saved the ship. It will probably be conceded that a far lighter blow would suffice to cut any unarmoured ship in half. The power to ram, or avoid being rammed, depends however on manœuvring power, in which merchant steamers are exceedingly deficient.

It is difficult to obtain accurate data, especially as to space; but the time may generally be relied on, and the angular velocity estimated from the time of turning the whole circle. Thence, if we deduct from 30 to 40 per cent. of the speed, according to rudder area, and fix upon a radius to correspond, we shall make as near an approximation as is possible.

The comparison of rudder surface and longitudinal midship section immersed also affords some guide.

It is given in the following table:—

Comparative Manœuvring Powers of Ships.

Ship's name.	Length.	Rudder surface A.	Longitudinal midship section, immersed, I.	English co-efficient, $\frac{I}{A}$	French co-efficient, $\frac{\sqrt{I}}{\sqrt{A}}$	Circle trials.			Remarks.
						Initial speed.	Time.	Diameter.	
H.M.S. "Shah"	335	203	7,455	36.7	6	knots. 16	m. s. 5.20	yards. 617	Steam gear. 32° helm in 15 secs.
French "Tourville" ...	327	...	...	...	6.55	16	6.12	72	Doubtful if steam gear used.
H.M.S. "Thunderer" ...	285	174	7,615	43	6.6	14 Revs. 79	4.6	365	Twin screw steam gear. 31° helm in 23 secs.
French "Bouledogue" ...	213	179.5	3,916	21.8	4.67	12	...	341	Twin screw.
H.M.S. "Minotaur" ...	400	198	10,367	52.4	7.3	14.3	7.39	939	Hand gear.
Ditto .....	...	...	...	...	...	14.3	5.35	585	Steam gear.
Atlantic mail steamer...	450	125	11,500 approx.	92	9.7	16	10.30	...	Steam gear.
Australian mail steamer	445	126	11,370	90	9.8	...	said.	...	Steam gear.
Steamer A.....	360	100	8,640	81.6	9	14	7.50	800 probably.	Steam gear. Captain thinks 1,200 yards.

The diagram No. 1 shows the dangerous space for rams of Her Majesty's ship "Thunderer's" class at 10.4 knots contrasted with that for a vessel of "Arizona's" class attacked by a 360-foot¹ war ship of equal speed, viz., 17 knots. Whereas in the former case the danger angle on the bow of menaced "Thunderer" varies from 35½° to 59°, the corre-

¹ Twin screw.

sponding distances being 516 and 400 yards respectively; in the latter the danger angle on the bow of menaced "Arizona" would be from 35° to 80° , and the corresponding distances 983 to 510 yards.

There are many points needing attention here for which I have now no time, but this suffices to show that so unhandy a vessel dare do nothing but turn her stern to a hostile ram while he was yet at least a mile off. She can then treat him on equal terms as regards guns and mortars, and on greatly superior as regards torpedoes.

To summarise as regards the ram—

(1.) Its arc of effective command lies always before the beam, and its distance depends on the comparative powers of the opponents.

(2.) Its effect at angles of keel exceeding 30° , is decisive.

(3.) It can always be evaded by a vessel of equal manœuvring power, if a proper course be taken, but where equal or superior speed is associated with greatly superior rudder power and shorter form it constitutes a danger only to be avoided by turning the stern to your opponent.

13. The third weapon is the locomotive torpedo. It is but a first attempt at a subaqueous weapon, and in the "United States Army and Navy Journal" of October 4th, 1879, will be found a description of a torpedo devised by Captain Ericsson for use from a gun, which seems to promise greater power, and comparing this with Sir Joseph Whitworth's¹ flat-headed hexagonal bolt fired from a 24-pounder through 33 feet of water and into a ship through 12 or 14 inches of oak beams and planking, we see that subaqueous projectiles for ordinary guns are by no means an impossibility.

It is improbable that the Whitehead, which is not a fully tested weapon, will maintain its course for more than 600 yards among ocean waves, if so far. Up to that distance it has a speed of 20 knots, or it would take 53 seconds traversing that distance, in which time steamer A at 14 knots would traverse more than three times her length. At 250 yards it has a speed of 25 knots, or it would traverse that distance in 18 seconds, in which time steamer A at 14 knots could go little more than her length. If steamer A were approaching it directly, she might be 391 yards distant at 14 knots when it was fired at 25 knots speed, or 1,016 if fired at 20 knots speed. If steamer A were receding directly from it, she must be 111 yards off if it is fired with 25 knots speed, or 184 yards if with 20 knots speed, for it to strike her in the intervals respectively under consideration.

Its destructive effect would be a great loss of buoyancy and stability if engines or steering gear were not damaged.

This will be discussed further on. The ship's torpedo-boat can steam 15 knots for two hours; it will be referred to under "Machine Guns."

The first class torpedo-boat is outside the present subject.

The locomotive torpedo, then—

1. Has angular command of 180° abaft the beam, and an effective distance which never exceeds 1,000 yards, and is frequently reduced to very much less. It cannot influence tactics beyond 600 yards.

¹ Sir H. Douglas, "Naval Gunnery," 5th edition, 1860.

2. Exceeds the gun in destructive power.
3. Could not be evaded if chasing an enemy at close quarters, but otherwise probably could be.

14. The fourth arm is the machine gun, of which there are three kinds at present in use, and a probability of an increase in their number and size with a view to their use against unarmoured ships.

Irrespective of the formidable nature of their fire against men exposed, and torpedo-boats, which they can perforate broadside-on up to 1,500, and end-on up to 200 yards, we must consider whether they could perforate the side plating of steamer A, which is $\frac{3}{4}$ inch for 179 feet amidships, tapering to $\frac{1}{2}$ inch at the ends.

The 1-inch Nordenfelt will perforate $\frac{1}{2}$ -inch steel plates up to 200 yards if the angle of impact with the normal be less than 40° .

The 1.85-inch Hotchkiss is stated to perforate $1\frac{3}{4}$ -inch steel plates at the muzzle, and the 2-inch would certainly perforate A's side from some distance. The 1-inch Nordenfelt with four barrels can be fired for seven volleys at the rate of 200 shots a minute, and any greater number at the rate of 120 per minute. The .45-inch Nordenfelt with ten barrels can be fired at the rate of from 800 to 1,000 rounds per minute; with steel bullets it is stated to perforate $\frac{3}{16}$ steel plates at 700 yards.

Mr. Hotchkiss states the rapidity of fire of his light $1\frac{1}{2}$ -inch and 1.85-inch gun as from 25 to 30 rounds per minute, the maximum being 60.

The trajectory of the 1-inch Nordenfelt has a maximum height of 10 feet at about 550 yards, but considering the rapidity of fire of these guns they would doubtless be formidable up to 1,000 yards. In firing at a low torpedo-boat, however, the lower the gun and flatter the path of the shot the better, and 300 yards to 800 yards would be the best distance. A torpedo-boat moving at a speed of 15 knots would pass over 253 yards in half a minute. She would manoeuvre to fire her locomotive torpedo from ahead of A so as to have the advantage from his motion. A ship with a good armament of these machine guns should, however, during the day at all events be able to sink a boat approaching her within 600 yards, as she could fire 1,000 rounds at her in half a minute.¹

To sum up—

1st. Machine guns possess an effective command of the full circle if properly distributed, the greatest power should, it seems, be developed on the bow and up to a distance of 1,000 yards.

2nd. It would seem doubtful if exposed men or light fittings could exist under such a torrent of missiles.

3rd. As with heavy artillery their velocity (initial from 1,300 to 1,450 f.s.) is too great for evasion.

15. There is one arm we have not yet considered—the rifled mortar, but a comparison of its accuracy tables with those of guns shows that it would be a formidable weapon against a long ship, end-on either chasing or being chased; and high angle fire will probably be more practised now that vertical armour has become so difficult to penetrate.

¹ *Vide* Mr. Hotchkiss's paper, in the Journal, No. CV, p. 279, *et seq.*

16. On quitting the subject of weapons I remark, that while it is difficult to estimate exactly their comparative value, their influence on tactical movements may be thus defined. The ram governs tactical movements when approaching an enemy's bow. The locomotive torpedo governs tactical movements when approaching an enemy's stern. The gun, when its influence is not superseded by the more potent ones above-mentioned, calls on you to keep your virtual target as small as possible, while developing your own fire to the utmost.

17. We must now consider more in detail the probable effect of piercing of compartments on a merchant vessel.

I. In her normal condition.

II. In her possible condition fitted for war.

Mr. Donald Currie has already given us the detailed results of damage to a compartment of steamer A on her longitudinal stability.

As all merchant steamers are not so well provided with horizontal watertight platforms at the extremities, I will mention an example calculated by a student at Greenwich, and which I owe to his kindness and that of Mr. White, Naval Constructor. This vessel is 360 feet long, 37 feet beam, and has a mean draught of 20 feet, with a displacement of 4,866 tons. The compartment under consideration extended from the stern 72 feet forward, and its centre of gravity was 123.5 feet abaft that of the ship. The effect of bilging the compartment was to admit when empty 333 tons of water; the height of the longitudinal metacentre was diminished by 197 feet, coming down from 503 to 306 feet, and the draught of water aft was increased 6 feet 9 inches. Had the compartment been half full of water excluding stores, the effect would have been about one-half as great; and had a watertight platform closed the top of the compartment at the original load water-line, the metacentric height would have been preserved. If a vessel came down 3 feet 6 inches by the stern, she would lose her steering power greatly; but if she came down a similar amount forward, her upper screw-blade would be partly exposed, and she would lose speed greatly, as well as manœuvring power. In the event of such a disaster twin screws would remain well immersed, and their steering power would be invaluable.

As regards transverse stability, it must be observed that steamer A has an extent of 94 feet longitudinally of side coal bunker without, as far as the drawings show, any horizontal platforms, but divided into four sections by vertical transverse divisions. However, a broadside of Hotchkiss shells would probably perforate her skin plating, $\frac{3}{4}$ -inch over that part, or at all events the lightest naval artillery would do so. As I have no construction drawings of steamer A, I have calculated the probable result on one of Her Majesty's ships, of which I have them, and they are very instructive. The dimensions of the vessel are—length, 260 feet; beam, 54 feet; draught, 21 feet 10 inches; tonnage, 5,100 displacement. I have taken a length of 93 feet with its centre 6 feet before the centre of the vessel, and supposed a coal bunker, 8 feet wide, with a vertical inboard bulkhead, and carried up well above the water-line, to exist there watertight.

The effect of bilging it on the ship's stability is shown in the table below, within the limits to which the metacentric method applies.

Condition.	Metacentric height, G.M. in feet.	Approximate angle of inclination.	Remarks.
Intact	3.73	Upright	
Bunker riddled, but full of coals.....	3.1	9	Lateral shift of centre of buoyancy .49 foot. Lateral shift of centre of buoyancy 1.36 feet.
Bunker riddled and empty	1.94	Beyond limit.	

Centre of surface in latter case shifts 1.43 feet towards intact side; coal is taken as occupying five-eighths of the space it is stowed in.

The differences between this case and steamer A are, that she has 9 feet less beam,¹ which is very disadvantageous. On the other hand, she may be stowed so that her metacentric height in intact condition is much greater, but this is impossible to estimate.² Altogether, perhaps, it is a fair example for her. The point of practical interest to seamen is the great importance of the bunkers being full.

From these considerations, it appears that merchant steamers in their normal condition are incapable of standing a broadside on their central portion, but by similar arrangements to those introduced into Her Majesty's ship "Iris,"³ and other war ships, they may be made as satisfactory in that respect as unarmoured sheathless men-of-war.

18. Having now taken stock of our vessels and weapons, we must consider—

I. What tactics are suitable for such vessels in single combat.

II. Whether they can derive support from one another in any formation.

III. How the weaker sort are to be protected, and the maritime roads kept open.

The first consideration in studying a subject, is to obtain clear definitions and nomenclature.

This is especially important where moving bodies are concerned. We must observe, therefore, that the study of ships' movements is only a branch of the general science of kinematics⁴ (*κίνημα*) motion, being in fact the kinematics of rigid bodies moving in one plane.

A ship in motion may be either undergoing translation, rotation, or a combination of the two.

And these motions may be estimated with reference to a fixed point, or with reference to another body also in motion.

¹ "Manual of Naval Architecture," Mr. White, and see Mr. Martell's paper "On Causes of Unseaworthiness, &c.," "Proceedings," Institute Naval Architects, 1880.

² If G.M. intact had been 14.5 feet, the corresponding figures would be 13.8 and 2½°, and 12.7 and 6½° respectively.

³ See Mr. White's paper in "Proceedings" of Institute of Naval Architects, 1879.

⁴ "Kinematic," W. K. Clifford, F.R.S., Macmillan and Co., 1878. "Traité de Cinématique pure," H. Besal Mallet Bachelier, Paris, 1862, 55, Quai des Augustins. "Delaunay Traité de Mécanique Rationnelle," Garnier Frères, Paris, 1866.

The latter is the case of our combatants.

A line passing through successive positions of the centre of gravity of a ship is called a "curve of position."

To plot curves of position accurately for various ships, we require accurate experiments, of which at present there exist available for common use very few.

But anything which gives decision to the mind of an Officer at a critical moment, must be valuable, consequently accurate experiments, and sound reasoning thereon, are of the first importance to this maritime nation.

Those who would apply natural forces successfully, must humbly study their laws.

The most convenient velocity units for use in connection with naval tactics are the foot-second, and the knot-hour. A knot at Greenwich is 6082.5 feet in length, consequently 1 knot per hour is 101.35 feet per minute, or 1.689 feet per second.

A cable being 200 yards, one cable per minute is in round numbers 6-knot speed.

The knot table is compiled in accordance with these principles.

For angular velocity, circular measure would give very small quantities, perhaps minutes of arc in seconds of time is the most convenient.

The angular velocity of a vessel moving at 25 knots past a fixed point 100 feet distant, is only $22\frac{1}{2}^{\circ}$ per second, or less than .5 circular measure, and when turning under helm, much less.

The fundamental figure in considering the relative movements of two vessels is a trapezium, which represents the portion of the curve of position of each body traversed during the given interval of time joined by lines at the extremities.

The object in view is to derive practical rules for guidance under all circumstances.

Every ship constitutes for those on board a great protractor, and angles are estimated from the bow and stern. When one ship draws forward on another, I call the angular change "angular advance."

When one ship draws aft on another or drops, I call the angular change "angular retirement."

The angle between courses reckoned from 0° to 360° , I call "angle of route," or "route angle."

Two sides of the trapezium must always be straight lines, being the distance of the vessels apart at the beginning and end of the time-interval under consideration.

The others may be curves if vessels are using their helms or twin screws.

Hence the graphical method seems the only way of treating the matter.

The great practical difficulty of getting correct distances from another vessel at sea when moving at speed, by any of the usual methods, makes the habit of referring the movements of another vessel to the ship as a protractor, and the study of the necessary consequences of angular change, combined with the known move-

ments of your own ship, an indispensable one for any one who may be called upon to fight a ship.

Admiral Randolph, who is one of the comparatively few Officers in our own service who have commanded squadrons, drew our attention to this last year in a forcible manner, and many other distinguished names, both of our own and foreign navies, might be quoted to the same effect.

A portion of the ocean large enough to fight an action upon, and free from any obstacles to navigation, may be termed a "tactical field." The instantaneous position in azimuth of the ship's keel produced may be called its axis.

All sailors agree that the first of qualities in a tactical field is speed.

Speed Table.

Knots per hour.	Yards per minute.	Feet per second.	Knots per hour.	Yards per minute.	Feet per second.
1	33·78	1·689	14	472·92	23·646
2	67·56	3·378	15	506·70	25·335
3	101·34	5·067	16	540·48	27·024
4	135·12	6·756	17	574·26	28·713
5	168·9	8·445	18	608·04	30·402
6	202·74	10·134	19	641·82	32·091
7	236·46	11·823	20	675·6	33·78
8	270·24	13·512	21	709·38	35·469
9	304·02	15·201	22	743·16	37·158
10	337·8	16·89	23	776·94	38·847
11	371·58	18·579	24	810·72	40·536 ¹
12	405·36	20·268	25	844·50	42·225
13	439·14	21·957			

¹ Knot at Greenwich 6082·5 feet.

19. It is quite obvious that speed confers the option of fighting upon its possessor.

Diagram 2, which I call a "horizon diagram," shows various positions of vessels on the horizon whence at certain speeds noted, they would reach, contemporaneously with O, the point 25 knots distant from O in the time-interval under consideration, which depends on the speed in this instance.

Similar suffixes denote contemporaneous positions. The trapezium OW, W₁O₁, is an example of the kind spoken of as fundamental. O is going 10 knots, and W 17 knots; at beginning of the hour, OW is the line joining them, at end of it, O₁W₁ is the line joining them.

The inner circle is at a distance of 15 miles from the position of O at the beginning of the interval under consideration.

Twenty-five knots' distance is about that at which a ship's mast is first seen by the masthead man of another in clear weather. At 15 knots' distance the Officers on the bridge of two steamers, like A, would be

above the horizon to each other, and at 8 knots' distance about 39 feet of each vessel's hull downwards from the bridge, which is 49 feet above the water, would be visible. Consequently, it would be possible at 8 miles' distance, with a good glass, to discern the character of a stranger.¹

The tactical field is then smaller than the horizon field in the proportion of 16^2 to 50^2 , or 1 to 9.8. These considerations bear upon the number of ships requisite to protect a given maritime route.

But although all agree as to the value of speed, no quantitative estimate of that value has, so far as I am aware, yet been given.

The key to this lies in considering the diminution of speed consequent on using helm and acquiring angular velocity.

The copy of the companion diagrams No. 5 to the "Thunderer's" turning trials as regards speed shows this; and it shows that the greater the initial speed, the greater the consequent angular velocity required in uniform stage, and the greater also the ratio per cent. of reduction of speed. But the use of speed to a war ship is to enable her to use her weapons. In what way, and to what extent, can it help us to do so?

This depends on the manner in which our guns are mounted, whether they will fire near the keel line or not.

A decisive superiority of speed, such as more than 2 knots, will, as shown in the abstract of curves of position² confer a power of ramming if you can get into the right position, but it is an old adage that a stern chase is a long one, and locomotive torpedoes, which we saw in Section 13 are of great importance in this matter, were not then invented. The abstract of the curves of position, comparing ship at 10 knots with ship at superior speeds up to 14 knots, and ship at 14 knots with ship at superior speeds up to 20 knots, show that in the former case at the end of 5 minutes, Fast has achieved an angular advance on Slow, from 38° initial angle on bow of 7° , $17\frac{1}{2}^\circ$, $36\frac{1}{2}^\circ$, 48° respectively, while Slow keeping a constant course, has noted an angular advance of Fast of 22° , $33\frac{1}{2}^\circ$, $47\frac{1}{2}^\circ$, $59\frac{1}{2}^\circ$ respectively, the distance remaining approximately constant, and in the zone of effective gun-fire, but not in that of effective torpedo fire. But if Fast's guns are capable of firing 23° from his keel-line, he has no object, provided he maintains his distance nearly constant, in getting any angular advance, whereas Slow, if his guns can only be fired 30° abaft his beam, cannot get a shot in until Fast subtends an angle from his bow of less than 120° .

Incidentally, and to avoid mistakes and shorten notation, I would borrow astronomical terms for the angle from the bow of a ship, and call it polar distance, or P.D.; we should then have S.P.D., and P.P.D., or starboard and port polar distance, to define relative angular position, irrespective of the magnetic meridian.

¹ "Herschel's Astronomy."

² These curves are constructed on the hypothesis that (1) a ship can turn 5° per minute, or $5'$ per second, without losing speed; (2nd) that the arc of such a circle traversed during one minute of time (radius about 7,700 yards at 20 knots) may be plotted as its chord without practical error.

Abstract of Curves of Position of Fast Ship F and Slow Ship S, marked off at minute intervals.

At end of 1st minute.

Fast's speed, knots.	Distance, yards.	Route angle.	Angle on Slow's bow.	Angle on Fast's bow.	Slow ship at 14 knots.
15	843	15	148½	47½	Initial position Fast is 800 yards off Slow and 23° on his quar- ter.
16	820	15	146½	49	
17	800	15	145	50½	
18	780	15	143	52½	
19	760	15	140½	54½	
20	740	15	138½	56½	

At end of 2nd minute.

15	910	15	140½	55
16	873	15	137	58½
17	838	15	133	62½
18	810	15	128½	66½
19	787	15	124½	71½
20	767	15	119½	75½

At end of 3rd minute.

15	950	10	135½	54½
16	900	10	130	60
17	860	10	124	66½
18	825	10	117	73
19	810	10	110½	80
20	806	10	103½	87

At end of 4th minute.

15	960	5	132½	53
16	900	5	125	60
17	856	5	116½	68½
18	830	5	107½	78
19	829	5	98½	87½
20	846	5	89½	96½

At end of 5th minute.

15	937	Same course	131	49	Initial P.P.D. at Fast 38°.
16	860	"	121	59	Initial S.P.D. at Slow 157°.
17	813	"	110	70	
18	801	"	98	82	
19	822	"	86½	93½	
20	874	"	75½	104½	

Abstract of Curves of Position of Fast Ship F at expiration of minute intervals, S at 10 knots.

At end of 1st minute.

Speed of F, knots.	Distance in yards.	Route angle.	Angle on Slow's bow.	Angle on Fast's bow.	Initial position F 23° on starboard quarter of S.
11	826	15	150½	45	Original route angle 15°. See note preceding page.
12	800	15	149	47	
13	778	15	147	48½	
14	766	15	145	50½	

At end of 2nd minute.

11	863	15	131½	51½
12	820	15	136½	53
13	785	15	140	59
14	754	15	144	64

At end of 3rd minute.

11	882	10	139½	57
12	823	10	133½	56
13	813	15	126	69½
14	783	15	119	76

At end of 4th minute.

11	876	5	138	48½
12	805	5	129	57
13	830	10	118	72½
14	806	10	108½	81½

At end of 5th minute.

11	853	Same course	135	45	Initial angle on Slow's bow, 157°, or S.P.D. On Fast's bow, 38°, or P.P.D.
12	767	"	124½	55½	
13	823	5	110½	74½	
14	816	5	98½	86	

At end of 6th minute.

11	831	Same course	133½	46½
12	733	"	120½	59½
13	798	"	104	76
14	811	"	90	90

At end of 7th minute.

11	810	Same course	132	48
12	703	"	116	63
13	780	"	96½	83½
14	825	"	80½	99½

At end of 8th minute.

11	788	Same course	130	50
12	675	"	110½	69½
13	773	"	89	91
14				

Again taking Slow at 14 knots and Fast at superior speeds up to 20 knots, we find the angular advance has been, after an interval of 5 minutes, on Fast's 11° , 21° , 32° , 44° , $55\frac{1}{2}^{\circ}$, $66\frac{1}{2}^{\circ}$ respectively, the distance varying between 740 and 960 yards; on Slow's 26° , 36° , 47° , 59° , $70\frac{3}{4}^{\circ}$, $81\frac{1}{4}^{\circ}$ respectively.

The previous remark applies with even greater force here.

What, then, can Slow do? But before considering this we must reverse the arcs of fire, giving Fast the small and Slow the great one. We then see that Fast would be 2 minutes at 14 knots, 3 minutes, 6 minutes, and beyond 10 minutes respectively, getting his broadside to bear at the respective speeds depicted, while Slow would enjoy a constant pound at him.

In our second example the figures run 2 minutes for 17 knots and upwards, and 3 minutes for 16 knots, which continues barely bearing, while 15 knots never gets his guns to bear. Slow meanwhile has Fast comfortably under full fire. Referring back to Section 16, paragraph 3, we see the importance of this.

20. If both are similarly armed they are in this diagram on equal terms; where in such a case, then, would be the value of Fast's speed? Superior speed gives a power of yawing to fire without loss of ground, which is valuable any way, but may be of decisive value if a ship can fire her broadside guns near the keel-line; for superior speed confers a power of turning quicker, and the "Thunderer" experiments show that if the arc to be turned through is small, very little ground is lost; whereas if the angle to be turned through is great, there is a considerable loss of ground.

No. of experiment.	Initial speed, knots.	Time of turning through		Loss of speed per cent.	
		23° .	60° .	When turned 23° .	When turned 60° .
		Seconds.	Seconds.		
III	10.44	44	$67\frac{1}{2}$	$7\frac{1}{2}$	15
IV	11.14	42	61	10	18.1

In the above experiments, when the uniform stage was reached, the reductions of speed were 31.8 and 35 per cent. respectively.

If, in order to approximate to the ground lost by a yaw, we suppose that an Officer from constant practice knows exactly when to right his helm, in order to alter course so much, so that at the instant of reaching that azimuth from his original course, the helm is amidships, it will then be in accordance with mechanical principles to suppose that the motion of the vessel is accelerated for a period equal to the time during which it was retarded, the whole distance traversed during the double interval being passed over at the mean speed during the single interval.

We thus see, considering only the time necessary to effect a given change in azimuth and regain original speed, that if the angle is to be 23° , taking the 4th experiment as an example, the double interval

will be 1 min. 24 secs.; and if the angle is to be 60° , 2 min. 2 secs. An analysis of the companion diagram, Fig. 5 (lithograph copy)¹ shows that the original speed being 18.81 f.s., the mean speed during the short double interval on the above hypothesis would 18.1 f.s., that on the long double interval being 17.5 f.s.; the consequent loss of space in comparison with a direct course being respectively 60 and 160 feet as regards actual distance through the water.

But when this distance is resolved into advance and transfer, we see (Diagram, Fig. 3) that the advance is in the former case for 23° yaw only 345 feet less than if the ship had maintained her course, whereas in the latter case the advance is 1,105 feet less than if no helm had been used.

It must be observed that these experiments were not undertaken with a tactical object,² and that the early part of the curve was of little interest to the observers, and that there is admitted to be something not quite satisfactory about it. I am of opinion that the facts would be more favourable to the small yaw than they appear, a ship being as regards azimuth in unstable equilibrium when moving through the water; but impressions are deceitful, and these are the best experiments we have.

If a vessel, then, with the extended arcs of training yawed off 23° , regained normal speed and yawed back to original course, she would have lost on the chase 690 feet, which, if she had 1 knot extra speed, would be regained in 7 minutes; whereas, if she did the same with arcs restricted to 30° from keel normal, she would have lost 2,210 feet, which it would take her 22 minutes to regain with only 1 knot extra speed.

These considerations appear to me to prove conclusively that superior speed associated with arcs of fire, approximating as nearly as practicable to the keel-line, are of first-rate importance with unarmoured ships where angle of impact is comparatively of no moment.

We are now in a position to answer Question 1, Section 18, as follows:—

21. The best tactics for such vessels are to turn their sterns to an enemy, make use of their superior speed to keep him at a constant distance, and ply him with missiles until he is disabled. If he fly, they may pursue, keeping outside the range of Whiteheads, and endeavour to gain a position on his bow, shown in full helm diagram, No. 4. (Supposing they are fitted for war in all respects herein indicated as necessary.)

22. As regards Question 2 it appears that a swift, handy ram on each flank of a line abreast of such vessels, would afford considerable protection to the whole line, and, bar ramming, the artillery and torpedo power of such a squadron would be very formidable.

23. Question 3 opens a wide field for discussion, which we must endeavour to narrow.

It must first be noticed that for naval purposes the world is divided

¹ Blue Book Report of the Committee on the "Inflexible."

² See Mr. White's lecture, and Captain Colomb's remarks, vol. xxiii, No. CI, "Journal of the Royal United Service Institution."

into two zones of a wholly different description: the inter- and juxtaposed zones in which fine weather and comparatively smooth sea is the normal condition of affairs, and the high latitudes to which the description of the "roaring forties"¹ is perhaps the most applicable. No better proof of this could be adduced than the different character of the steamers designed for these zones. The Atlantic mail ships possess now, as in 1853, a great superiority in strength and power, though their forms are far from perfect, over those vessels built for service in less boisterous seas. It is worthy of note that the 57 ships, including the war steamer "Hatteras" recorded as having been destroyed by the "Alabama" in her short and eventful career, 1863-64, were all captured in the fine weather zone, and it is there that the greatest development of protection would be needed.

We have seen, Section 2, that though steam is annually absorbing a larger proportion of the total tonnage, yet 60 per cent. of that tonnage is still in sailing ships.

Those who have rejoiced at seeing a slave dhow run into a calm round a point, may imagine the harvest an unmolested rover might reap on the skirts of the trade winds.

In all schemes for the protection of commerce, it is assumed that an enemy's fleet would be accounted for by our own, and that the escaped rovers (and that many would escape, all experience proves), would alone be at large on the high seas.

There are but two ways of protecting slow merchant steamers and sailing ships, viz. :—

I. Convoy.

II. Patrol of routes.

The only convoy since the introduction of steam navigation, is that which transported the British Army to the Crimea in September, 1854.²

It consisted of 27 steamers towing two ships each.

2	"	"	one ship	"
2	"	"	not towing.	

In all 31 steamers, 56 sailing ships in tow, and 7 tugs. They were formed in 6 lines, 4 cables apart, ships 4 cables apart, making a square of roughly $2\frac{1}{2}$ miles each side.

The protecting force under our own flag was 10 line of battle ships, only two steam, 4 frigates, 1 being steam, 11 war steamers, and 3 war transports.

Fine weather was experienced during the two-day voyage, and no difficulties of any sort arose.

It may, I think, be affirmed without hesitation, that as far as keeping a steam convoy together, or one formed of steamers towing sailing ships across the variables, less difficulty by far would be experienced than in the time of sailing convoys.

But it must be admitted that a concentration of weakness invites

¹ "Meteorology," J. N. Laughton, Esq., R.N.

² Vol. vi, "Journal of the Royal United Service Institution," Captain Mends, now Sir W. Mends, K.C.B.

attack, and the impediments to trade from waiting on convoy are serious.

Still, toying through the variables would doubtless be one phase of protection to commerce in war.

A glance at the patrol alternative must now be taken. If lines of traffic were confined to a belt 50 miles wide, a war ship on each edge would just see the limit of the other's horizon. But taking steamers only, and granting a vessel like the large ship No. 20 a power of getting 12 knots on an emergency, we see that a rover possessed of 15 knots speed, and not recognised as such until 8 miles off, would in 2 hours be near enough to molest, and in $2\frac{1}{2}$ near enough to sink the cargo ship. If the latter turned and ran for succour, she must then not have more than 24 miles to go for it, or the war ship must be topping her horizon constantly.

This seems to indicate that an effective patrol on the ocean would require ships on main routes at 50 mile intervals, or 20 ships per 1,000 miles.

Doubtless both methods would be employed in war, and a convoying squadron, consisting of a suitable assortment of vessels, ought to give an account of any enemy, and not allow him to attack a second time. Merchant steamers fitted for war would usefully form a part of all such squadrons, as also of patrolling forces.

24. To sum up then, a very large force would be required for the protection of our trade in war, and many merchant steamers, if suitably fitted, might form part of that force.

My idea of the best way to construct a merchant steamer for possible utilization for war, is to give her 360 feet length, 55 feet beam, and to place her first and second class saloons on the upper deck, before and abaft the engines, and uptake, &c. If each saloon were 48 feet square, there would be room for a glacis, high enough to protect slides and rollers of guns from hostile shot.

On war breaking out, the tops of these saloons would be removed, and the guns placed in battery. If considered desirable, one gun might be placed aft, and one forward for end-on fire.

I think guns should be the highest things in a ship, and centralized as much as possible. Such saloons would hold four 4-ton guns each.

25. As regards the financial part of the matter, it seems fair that Government should specify the alterations and additions to design required, and on obtaining a legal right of pre-emption, should pay a percentage on the prime cost of such additions to the owner as long as the vessel remains fit for service.

Such additions would be limited to internal fittings, as forms and proportions suitable for stable sea-keepers would alone be taken into consideration.

26. The bearings of the foregoing considerations on the policy of unarmoured construction seem to me to be that—1st, sub-aqueous weapons make large displacements advantageous, for there is a limit to the localization of damage, and the ratio of the area of that damage to the total displacements is far smaller in large, than in small vessels.

A vessel of the displacement of Her Majesty's ship "Volage" seems to me to combine power and efficiency without representing too large a fraction of the total force. All dispatch vessels could be procured from the mercantile marine, tea clippers, &c.¹

27. We must glance at the manning question, which, though not belonging to the present subject, is of too great interest and importance to be ignored. It appears, from a return lately presented to the House of Commons, that there were in 1879, 169,145 British merchant seamen, of which 51,363 were employed in ships over 300 tons. The total number of seamen employed was 193,548, 14·43 per cent. being foreign. In 1852, 3·7 per cent. were foreign, and in 1872, 11·24 per cent.

By the statement made by the First Lord in Parliament this year, there are 58,800 men and boys in the regular Navy, and 17,480 men in the three reserves, while the Naval Artillery Volunteers numbered 1,109. Those numbers united fall far short of the fighting strength of the Navy, and it seems evident that the subject requires careful attention at the hands of statesmen, and that the basis of England's naval power should be co-extensive with her maritime population.

28. The detailed organization required for the event of a sudden outbreak of war has already been discussed by Mr. Donald Currie, and some such plan as he suggests will doubtless be carefully matured.

29. The real strength of England lies in her numerous maritime population, her unrivalled powers of construction, and her strategical advantages.

A nation possessing 80 per cent. of the steamers, and 37 per cent. of the sailing ships in the world cannot be accused of arrogance or menace for aiming at naval supremacy.

If I may conclude with a similitude, I will liken naval supremacy to a costly jewel enshrined in a casket, fastened by one of those curious locks which require the simultaneous presence of five persons to open, and I will record my conviction that only by the hearty co-operation of the statesman, the sailor, the naval architect, the engineer, and the artillerist, can the jewel of naval supremacy shine unsullied on the brow of Britannia.

The CHAIRMAN: There could perhaps be no subject selected more important than the one which Captain Long has so ably put before us. It raises questions which for many years have been gradually ripening for solution. So much impressed was Russia with the enormous importance of the organized power of these large merchant steamers, and during the recent complications of Eastern affairs, so prompt was her action, that our merchants in California at once felt the pressure, and a very influential deputation was sent over to Lord Beaconsfield to impress upon him their conviction that in the event of war being then proclaimed with Russia, their ruin was almost certain to take place. It can be no reproach to our Controller's department that they are not able to produce what is commonly called a man-of-war—that is to say, a ship carrying guns and a large crew, and requiring her engines and boilers and magazines to be more or less protected from shot and shell—that can at all equal

¹ Papers by Mr. Barnaby and Mr. T. Brassey, M.P., 1876, Institute of Naval Architects.

in speed or coal-carrying capacity the magnificent steamers of the mercantile marine. Take, for instance, two of those in Table III, one the Atlantic mail steamer which has lately made a voyage of 2,800 miles at the astonishing speed of $15\frac{3}{4}$ knots throughout the whole passage; and the Australian mail steamer which appears to have compassed 16,000 miles at 10 knots without taking on board a single extra bag of coal. With these resources at the command of the Government, I think we may expect that our commerce should be at all times efficiently protected, and our fleets never left without an adequate supply of coal. We shall now be very glad to hear any observations upon Captain Long's paper.

Vice-Admiral RANDOLPH, C.B. : It is quite impossible for us to have listened to the able paper which has just been read without being very strongly impressed by a sense of the depth with which the writer has gone into the subject, and the great pains he has taken to lay it before us. So elaborate is it, that it is absolutely impossible on the spur of the moment to attempt to dissect it. I therefore simply rise to congratulate the gallant lecturer on having brought the subject before us so ably, and introduced one so well worthy of our attention. I shall not presume to discuss the paper, but shall only take the opportunity of making one or two remarks. "On the question of 'tactics,' he says, 'that a swift handy ram on each flank of a line abreast of such 'vessels would afford considerable protection to the whole line, and, bar ramming, the 'artillery and torpedo power of such a squadron would be very formidable.' That requires some little explanation; I should hardly have alluded to it, but that I was very much struck by this.

The writer just glances at the manning question, though, he says, "not belonging to the present subject." It is a most important part of the present subject; I think we are beginning at the wrong end of the matter; it is like first of all buying steam engines, and then finding no fuel wherewith to work them. Buying or hiring ships, or subsidizing shipowners to supply them, without providing men to man them, is beginning at the wrong end of the business, therefore I think instead of being outside the subject, it is most important. I am anxious to make this observation because no time is to be lost in taking every means whatever to impress it upon the authorities. I am alluding particularly to what I am afraid may be the impending death warrant which is about to be signed of the Royal Marine Artillery. Respecting these merchant ships that are supposed to be introduced, instead of supplying us with strength, it is necessary to consider whether they will not absolutely diminish it. How are they to be manned? If the answer be, by their own crews (and which are the Naval Reserve, at least I hope so), why that Naval Reserve is instituted for the reinforcement of the Royal Navy, and how are we to get on without them? This is a very serious consideration. Not only will these men be abstracted from the positive fighting strength of the Royal Navy, but these very ships will detract from another very important part of our strength. It is not to be supposed that they will be able to go to sea without a staff of well instructed gunners, either Officers or petty officers. It is a very serious consideration. Every one of these ships that go to sea must be a drain upon our resources for gunnery instructors. I am old enough, I am sorry to say, to remember when the Marine Artillery were the only efficient gunners we had in the Navy. Without any disparagement to the Officers of that day, I perfectly well recollect myself being at sea with guns which could hardly have been worked without Marine Artillery, for they alone understood the cutting and fixing of fuzes: I say the Marine Artillery would now-a-days be exactly in the same position in the mercantile navy that they then occupied in the Royal Navy, and they would be most invaluable in that respect. Besides that, they are good for almost everything, they are not only good gunners, but they are good infantry men. I do not know that they would make good cavalry, or royal yard men, but they are very good for three-fourths of the duty of sailors of the present day in ships of war. They are most efficient men, and no more valuable corps ever served Her Majesty's or any other Crown or country. And yet I fear their death warrant is signed. It was the object of bringing this consideration forward that induced me to trouble the meeting.

Commander CURTIS : I can corroborate what Admiral Randolph has said with respect to the Marine Artillerymen. In fitting the "Royal Albert" in 1854 the Marine Artillerymen and Marines fitted every piece of gun gear on board that ship. If I

may be allowed to touch upon the manning question and the Naval Reserve, we see a long list of Naval Reserve Officers in the Navy List, and I should like to know what ships those Officers are to serve in, whether the men are to be taken on board men-of-war, or whether they are to serve in their own ships. We hear that there are between 30 and 40 ships nominated to take the positions we require. Captain Long has stated that between here and America, we shall require ships every 50 miles.

Captain LONG : I only mentioned in fine weather districts.

Commander CURTIS : Between America and England we should require 60 ships. Looking at all our trade routes all over the world we should require to cover 60,000 miles at the lowest estimate so as to guard them with naval cruisers. One of the other points suggested was how merchant ships are to protect themselves. I think it is possible that they will go in groups of three or four, and perhaps two of them will be contented with such guns as we saw an account of the other day on board a vessel called the "Belle," which the Chilians purchased (was an Irish trader), and which bombarded Arica from a distance of between 7,000 and 8,000 yards with impunity. She had an 18-foot Armstrong gun on slide pivoting in the centre. The Americans now have a surplus of 100,000,000 dollars, and the President regretted that they should only carry one-third of their trade, and I think it is very likely the Americans will be in the market for some of our merchant ships; and we may conclude what havoc the "Alabama" played upon their trade by our having to pay 3,000,000% of money. It is a source of regret that we can only get 12,000 Naval Reserve men. Now there are 50,000 fishing boats employed daily on our coast, and we cannot but come to the conclusion that these fishing boats have some very fine men upon them, and I think there are none superior as fore and aft seamen, to our fishermen. The tendency is now to recruit from inland boys. I say inland boys are all well and good for military purposes, but for the Navy we want lads that have been accustomed to go out on the water from the time they can crawl. They are already seamen, and all you have to do is to teach them gunnery. I know that the boatswain of the "Sanspareil" in the Black Sea during the Crimean War, who went down the cliff at Balaklava and saved the few left of the "Prince" transport, was a Lynn fisherman; he was afterwards appointed boatswain of Malta Dockyard. In 1842, on board the "Queen," we had many good men who were fishermen and lightermen. I would suggest that if the Admiralty have taken up any ships they should appear in the Navy List as Reserve ships, and I should like to see a little more recruiting from our sea coast.

Captain H. D. GRANT, C.B., R.N. : I am under some disadvantage in not having read Captain Long's paper, but I wish to refer especially to the manning question that Admiral Randolph has brought forward, because that is of the first importance. I suppose, without any disparagement, very few in this room have had more experience of the mercantile marine than I have had. I regret that in all the statements that have been made, the state of the mercantile marine has not been properly represented. I think the Government have lost sight of it. I know myself that its state of discipline at this present moment is as unsatisfactory as it can possibly be. The Officers have really no control over their men. The Officers are the finest body of men we have in the kingdom, but they are not supported by the Legislature, and they really do not know where their powers are, or how they can exert them. In taking up merchant ships for war purposes it is very clear one of the most important things is, that they should have disciplined men. Our Naval Reserve men are not trained with that view; they are trained certainly at their guns, but I do not hesitate to say that nine-tenths of our Naval Reserve have no idea of what the meaning of the word "discipline," as understood in a man-of-war, is. There is another very important point, and that is, that the large proportion of our ships are manned by foreigners. A Peninsular and Oriental steamer not long ago had not a single English-speaking man in her crew, she had all Italians, and the Officers were the only men that could speak English. I ask if that is a satisfactory state of things, and whether we should not commence by endeavouring to improve our mercantile marine so as to make it really a nursery for the Navy, instead of taking up the ships and fitting them when we have no men to man them with? With regard to the ships themselves a great deal requires to be done, and at a very

serious cost. The question of watertight bulkheads, which is one of the most important, is not satisfactory throughout the whole mercantile marine. I do not hesitate to say that the bulkheads are simply a delusion and a snare, they are too far apart, they are not carried high enough; and if you multiply them, the question of economy of stowage and the difficulty of placing them in such a way as to give the fullest freight-carrying power to the ship comes in.

Captain BEDFORD PIM, R.N.: Captain Long has given us some statistics about the manning of the mercantile marine. I think he says at the end of his paper that we have 193,548 seamen in the mercantile marine, of whom 14 per cent. are foreign. Now, I have had a very great deal of experience of merchant seamen, and I must observe that the percentage of foreigners in the mercantile marine of this country is much nearer 80 per cent. than 14. Anyone who goes down and sees the crews shipped at the east end of London will see hundreds of ships go to sea without a single English soul on board, all foreigners, with the English flag flying. That is the present state of affairs, and I think it is dangerous to this country. It is dangerous in this respect. The Royal Naval Reserve has been alluded to. I was the Officer sent down to start the Royal Naval Reserve twenty years ago at North Shields, and I have taken great interest in it ever since. The Royal Naval Reserve numbers about 12,000. Now, in the event of war, what would become of these foreign crews? Would they stop on board your ships, and if they did, could anything be more dangerous? Of course, they would be more than human if they did not take these ships to an enemy's port. Assuming that they go away, how are you going to fill up their places? Can you take one of the Royal Naval Reserve away from the merchant service? It would be utterly impossible. We must have food brought into this country, and we must have merchant ships for the purpose, and those ships must be manned: not a seaman could be spared for the Royal Navy. Last year no less than 1,000,000 tons of grain, coming in a thousand ships, sailed from San Francisco for England. Everybody in this room knows perfectly well how easy it would be to cut that communication. You could cut that communication with a couple of "Alabamas" with the greatest ease. You *must* have food from abroad; you must man ships to bring the food; and you have not got the men. You cannot use foreigners, and you must use the Royal Naval Reserve for a purpose quite foreign to its organization. Where are you then? I have heard the remarks made by Admiral Randolph with the greatest possible pleasure; it seems to me he is perfectly sound in the remark that the manning question is the question of the day. You cannot use your ships if you have not got men to put on board. I have taken so large an interest in this question of manning, that I hope that will be my excuse for addressing the meeting. I could not allow these extraordinary figures of the Board of Trade, 14 per cent. foreigners, to pass without contradiction. Being an old-fashioned sailor, I do not quite understand some of the new terms that are used by Captain Long. A "fundamental trapezium" is a sort of thing I do not know anything about in respect to ships. Then we are to have an "angular advance" and an "angular retirement." I daresay it is very pretty; I should call one running away and the other fighting. In other respects I think Captain Long certainly deserves well not only of this Institution but of the country for the very able way in which he has put his paper together.

Commander W. DAWSON, R.N.: I think Captain Long must be rather sorry that he introduced the question of manning into his paper. The highest testimony that can be borne to the real depth of his paper is, that everybody has fought shy of discussing its proper subject. He has given us rather a hard nut to crack; and if Admiral Randolph fights shy of cracking it, I think others may be forgiven their silence. There is only one point on which I wish to make a suggestion, and it is this. Captain Long has given us the result of only one set of experiments made with the "Thunderer." Some years ago I wrote an article in "Fraser's Magazine" on the question of "Tactics," in which I pointed out that there was a great source of information involved in the experiments which might be made by the Steam Reserve when they went out to try ships' engines; and I suggested that an Intelligence Committee should be appointed to determine what is the kind of information that tacticians require, and that the information determined upon should be sought by all Captains of the Steam Reserve when going out to try the

vessels. There is no way by which you can determine, in a heterogenous fleet, what is the helm-angle of the different ships which would make them all turn in the same circle. Ships suddenly brought together to form a fleet may be required to charge an enemy's fleet at full speed, and then to turn round and repeat the charge. The helm-angle required to turn the whole fleet with safety to each other, could be very easily discovered: let the Captains of the Reserve, when the different ships go out to try their engines for the six hours' trial or at the measured mile, just put their helm over to given angles and make observations upon it. Then let such like observations be carefully recorded and compared with those made as to other ships. For want of an Intelligence Department we are allowing valuable information to be lost, when we might have large quantities of information on every one of the questions of helm-angle and turning powers, which are most important with reference to tactical discussion. Whatever my friend Captain Pim may say with reference to the trapezium and like terms, it is very important to have some definite terms before us, otherwise we may be comparing things that are unlike: and if we are to compare things that are alike we must have information of a like kind with reference to vessels of different classes. I would congratulate Captain Long on giving us so hard a nut to crack, and I am quite sure that many of us, when it comes out in the Journal, will study it with very great benefit.

Mr. T. BRASSEY, M.P.: Being about to occupy a somewhat more responsible position in connection with these matters than that which I have held when formerly taking part in the proceedings in this theatre, it would be, I presume, committing an act of indiscretion if I were to enter into the details of the question which has been brought before us in Captain Long's paper, and as to which, all who have addressed this meeting seem to be agreed, that the subject is at once important, and also difficult. But I think I shall not be committing an indiscretion if I venture to say, that I rejoice to find that Captain Long is worthily employing the leisure which he has at his disposal while on half-pay, in ventilating the very serious question which he has brought before us this afternoon. On the last occasion when Captain Long and I were together, our respective ships were at anchor side by side in the distant harbour of Honolulu. I am very glad to meet him once more in this theatre, and to find that our minds have been working together on this great question. Some years ago, the Council of this Institution asked me to read a paper with reference to the employment of the mercantile marine as an auxiliary to the Navy. In responding to that invitation, and in suggesting that our great mercantile marine was not only a source of weakness in a certain sense, as offering a large vulnerable area to the attack of the enemy, but that it might also be under proper organization a source of strength, I was broaching what at that time was regarded as a somewhat novel and impracticable idea. The question has made progress since those days. It is now discussed in a different spirit, and with a different appreciation, not only in this theatre, but at the Institution of Naval Architects, and in the columns of the press. I noticed with deep satisfaction, that in his speeches at Midlothian, the present Prime Minister spoke with favour of the suggestions which had been made by Mr. Donald Currie, in his lecture at this Institution. I do not in the least know what may be the views of the present Admiralty when it is constituted. It is not yet constituted, and I have not yet done a single day's work; I may therefore, perhaps, speak with somewhat more freedom than if I was talking of a body actually responsible for the administration of public affairs. But I should be quite presumptuous if I were to attempt to enter into the tactical question which has been discussed with such ability by Captain Long in his paper. I suppose, however, we shall all agree to this, that a merchant steamer, however armed, must be an inferior antagonist to a vessel built expressly for war, and with all the equipment and the preparations which may be given to a vessel expressly intended for war. But I do not apprehend that it is contemplated that we should send forth our merchant steamers to engage with the regular war vessels of the enemy. It is not with that object in view that the notion of securing auxiliaries in the mercantile marine is entertained, but it is with the view of repelling the attack of other merchant steamers which may be armed and sent forth to attack our mercantile marine, that the notion is put forward. I suppose we shall all agree to this, that an armed merchant steamer must be a very

serious antagonist to an unarmed merchant steamer, and the battles which the advocates of these proposals contemplate, are battles between merchant steamers under our own flag endeavouring to repel, and I hope, successfully, the attack of merchant steamers under a hostile flag. Our necessities in case of war must be measured by the nature of the force which will probably be sent forth against us. Not long ago, this country had to contemplate the possibility of a war with Russia. What was the nature of the attack with which we were threatened? Russia did not propose to land her hosts of armed men upon our shores; she did not propose to send forth armed vessels, vessels built specially for war, to attack our mercantile marine, but Russia went to the United States, Russia went to the trading ports of continental Europe, and there bought, upon the best terms she could, a certain number of merchant steamers, and it would have been by those steamers that our mercantile marine would have been attacked. If our Navy were equal to the task, of course it would be quite unnecessary to contemplate the idea of supplementing the regular Navy with auxiliary vessels from the mercantile marine; but as our Navy in its actual condition is not equal to the task of patrolling the whole area of the ocean and guarding our entire mercantile marine, it does occur no doubt to some, and I do not think altogether unwisely, that it might be necessary upon emergency to secure auxiliary vessels as cruisers from the mercantile marine. It would be altogether improper that I should commit myself to any specific declaration as to the terms upon which such an arrangement might be carried out. What we do know is this: that whenever we are threatened with war, the owners of the most available and suitable ships in our own mercantile marine are subjected to immense temptations to dispose of those vessels to our enemies with the view of their being employed to attack us; and if some arrangement could be contrived by which we could prevent our most suitable and swiftest ships from being transferred to foreign flags and employed as enemies to ourselves, I say it would surely be statesmanship to frame some arrangement by which such proceedings should be prevented. The question of manning is, of course, most serious. In former years I have always been a good friend to the Naval Reserve, and I was very glad to hear Captain Curtis say that he thought the fishermen were a desirable body from which to recruit. In years gone by I did my best, by a series of speeches in the House of Commons, to attract the attention of the powers that then were to our fishermen. I pointed out that they had what all our seamen have not—they had a local habitation and a name: you knew your men and you knew where they lived, and therefore you could put your hand upon them when you wanted them. The blue-water sailor, by the very circumstances of his calling, is necessarily for the most part absent from our shores, and therefore not at our disposal at the very moment when he is wanted: but the fisherman who has a home ashore and returns to it very frequently can be made use of upon an emergency. I do not believe that our fishermen would do the work which our highly trained men on the Royal Service are able to do. I do not suppose they would be quite so lively on the royal yard as men who are trained to that sort of work from their earliest boyhood, but they would do some part of the work which the Navy has to do,—they would assist you to defend your coast, they would assist you to man your mastless vessels, they would assist you to man your smaller classes of masted vessels; they would, therefore, come in and add something to the defence of the country, and if we were attacked by a combination of formidable enemies, we could not afford to dispense with any resources which we possess for securing our national safety and honour. I know very well in some of our merchant vessels the proportion of foreigners is large, indeed it is overwhelming; and I cannot but regret, as an Englishman, that we pay a vast subsidy to a powerful company which gives no employment to our own English-bred seamen. Why is that? Because we have imposed no conditions of that kind in the contract which we had negotiated. It might, perhaps, be a question for consideration whether we ought not to have done so; but, as a matter of fact, no condition of that kind has been imposed, and the voyage which these ships have to make, is a voyage in which sails are less valuable than they would be in regions of the sea where the winds are more favourable to the prosecution of the voyage. Up the Mediterranean, down the Red Sea, and across the Indian Ocean, sails are practically of very little value to the steamers in the Peninsular and

Oriental Company, and I believe it is an unsettled point among the commanders of that company whether or not they derive the smallest advantage from the area of canvas which they are actually able to spread. Hence it is that the seamanship question is not very much considered in the constitution of the crews. On the other hand, Lascars are well able to bear the heats of the Red Sea. Their wages are exceedingly small, and, for an equal sum of money, the Captain has at his disposal three Orientals for one Englishman; and inasmuch as the duties of these men are more those of a sort of nautical housemaid than those of seamen, in the proper sense of the term, they are no doubt satisfactory. As an element of nautical defence, I quite agree they would be worthless, and we must regret that such noble ships are not manned by men on whom we could rely in the hour of national emergency. The question of the manning of the mercantile marine is, of course, a very grave one. I really do not know how we are to meet it by any action on the part of the Legislature or the Government. We leave these things to be settled by the enlightened self-interest of the shipowner. No doubt the growing application of steam to propulsion over the seas is tending, to a large extent, to make owners indifferent as to the seamanship of the men that they employ. When, however, a disaster occurs, how painful is the result. I do not know anything that can be more unsatisfactory than the deplorable state of helplessness to which one of the Peninsular and Oriental Company's steamers was recently reduced in the Channel. Perhaps experiences of that nature may make an impression upon shipowners, and make them think it more desirable to employ Englishmen in the mercantile marine. At any rate, we must all come to this conclusion, that, in proportion as the seamen of the mercantile marine are indifferent and unreliable, so it becomes more and more important and essential that the Royal Navy should train up a powerful and thoroughly reliable body of men to man the fleet in the hour of the national emergency.

Colonel NUGENT, C.B., R.E.: There is one question I should like to ask the lecturer. I understood him to say the inaccuracy of gun-firing at sea was such that our guns could not now command more than a thousand yards. If that is the case, it very unfortunately equalizes the power of guns, and has a very important bearing on one of the proper points for discussion in this paper. This is a subject on which we have spent a good deal of time, and it has always appeared to me that we might look to obtain very great advantage in the employment of merchant vessels, by being able to put into them superior gun-power to the gun-power of foreign nations. In the case of the 6-inch gun, we know that on land a range of over 7,000 yards is obtained with extreme accuracy. Is there good in going beyond 1,000 yards, if the remaining 6,000 or 7,000 yards at sea are valueless?

Admiral of the Fleet Sir GEORGE SARTORIUS, G.C.B.: The subject Captain Long has introduced is one of the deepest importance. There are springing up now great maritime nations, with formidable fleets, that very recently were unimportant as commercial nations, that had not a single vessel a short time ago, and if we wish to retain the empire of the ocean we must, *coûte que coûte*, be more powerful than any three of the most powerful of the naval nations of the earth. I have a deep conviction in my mind that, if proper attention is paid to the mercantile marine, it will be a most important auxiliary to our Navy, in various ways. Men in the mercantile marine have much more opportunity of acquiring experience at sea than men in the Royal Navy, for our ships are generally more in harbour than at sea, and very few of them are rigged. Therefore the opportunities that we should have of getting experienced men will be very much aided by trusting to the commercial marine. And, then, consider that it is possible, if these suggestions are carried out, that the mercantile steamers could come in and assist in an action that is going on between regular men-of-war. We must try to get the merchant steamers built so as to abridge as little as possible their mercantile properties, while, at the same time, their military character can be very much brought in to serve the purposes of war. It is men like Captain Long, who have youth and means of obtaining fitting experience, who will be able to do much when the subject is properly encouraged. I only wish that I had lived some forty or fifty years less, and then I should be able to do more. I hope that our country, having played so important a part in the world, will always retain its position. It is by the permission and support of the Great Power above, that we have occupied the position we are placed in, and we may be sure that the

same God that has protected us throughout our long career of glory and of benefit to mankind will still continue to assist us with His infinite goodness, and love and mercy.¹

Captain BEDFORD PIM: If I may speak again, I should like to say that Mr. Brassey has told us, and we all know perfectly well what interest he takes in naval affairs, that he is at a loss to find out any method by which the mercantile marine can be manned. I grant it is a difficult subject, but I think Admiral Randolph has sounded the key to a solution of that difficulty. He spoke in terms of the Royal Marines which I think every Officer in this room must endorse. Anyone who has served with the Royal Marines knows perfectly well what a splendid body of men they are. Now, if instead of abolishing these men, we had 50,000 of them, and put them on board our passenger ships, one marine to every hundred tons, you would have an excellent nucleus for the crews of such ships. The shipowners would be delighted to have such men, and the men themselves would be very glad to go, because they would be paid a trifle more than they would be paid in their barracks, and so, it seems to me, that there is a solution of Mr. Brassey's difficulty at once. Assuming that you have 4,000,000 passenger tonnage in the mercantile marine, you would have an army of between 40,000 and 50,000 men, the very finest in the world. I suppose no Englishman who has ever been into action would not be very glad of these Marines. They are as true as steel, splendid men, who would soon introduce discipline into the mercantile marine, and I think if Mr. Brassey would just turn over the idea I have sketched out, in his mind, he will eliminate something in that direction which will be of real benefit to the mercantile marine, and therefore to the country.

Lieutenant C. CAMPBELL, R.N.: I should like to ask Captain Long whether this Institution has not been a great assistance to him in the framing of his paper? I think it is not generally known how useful this Institution is, and I take this opportunity of trying to draw the attention of some of my brother Officers to it. Something has been said about nomenclature, and I would endorse every word said by Captain Long upon that point. In these days we must have perfect terms by which we can express our thoughts. Where we had to reeve the ropes we now have to reeve the path of the ship. Before I sit down, in case any of you have been depressed by the observations of the Chairman with reference to foreign vessels, I will read a passage which appeared in the *Standard* a short time since:—"The Russian volunteer fleet, having no opportunity of fulfilling its original purpose of 'destroying the commerce of England, is now to be employed in establishing that of 'Russia.'" I fancy they will find that a more useful, if not a more agreeable employment.

¹ I am persuaded that all mercantile steamers could be constructed so as to combine the essential qualities of the merchant ship with such formidable ram-power as might sink or utterly disable the strongest ironclad now existing, and incur only the ordinary risk attached to war vessels. This ram-power must be always horizontal, and therefore necessitates its being built into the vessel. Every vessel available for war purposes should have masts to lower down, or, if this be impracticable, the shrouds should be the smallest number possible, and so arranged that in preparing for action they could be strapped close to the mast. Imperfect protection is especially to be avoided. The shot from the 100-ton gun would cause infinitely more damage to a heavily-armoured vessel than to a thinly-plated ship, on account of the quantity of splinters rent from the sides of the former, while in the thinly-plated ship the shot would make but a clean hole and comparatively few splinters. The blow given by the ram would make a rent of 24 or 25 feet in breadth by 4 or 5 vertically. 14 feet of water maintained over the engine and gear would be all but a safe protection from its being damaged by shot. The greatest dangers merchant vessels could be exposed to would be from boarders or torpedo-boats. Against these outriggers might be constructed. The enemy could be attacked only by sailing cruisers with steam as auxiliary, particularly in Eastern waters, where coal is scarcely procurable. In future wars, coal will no doubt be considered military stores, and therefore not procurable in neutral ports. A powerful stern battery is, next to the ram, the greatest necessity.—G. R. S.

Admiral Sir FREDERICK NICOLSON, Bart., C.B.: I am delighted to hear, as Chairman of the Council, that the Institution is of so much use to those Officers who devote their time to the preparation of papers like that we have heard to-day. What I wish to say is this: that, if our gallant friend, Lieutenant Campbell, or any of our younger Officers on the active list of the Navy, will only bring us a large number of additional members, the Council will be most ready and willing to afford them even greater facilities than are now afforded by the Institution.

Captain LONG: I think perhaps I shall reply in the most fitting manner, if I first reply to Sir George Sartorius, who, as the oldest member of my profession, and occupying the highest position in it, has the first claim to be heard. I am happy that nothing I have said called for his criticism, and I hope all my brother Officers will take to heart what he has said, for I am sure we cannot do better than remember the lessons which are taught us by our predecessors. Sir George referred to his age, but I think it is a notable fact that the newest weapon of the day is due to the oldest Officer of Her Majesty's Navy. I must next refer to Admiral Randolph's remarks in paragraphs 21 and 22. Of course, I cannot go into details. When I say a swift ironclad ram would protect the flanks, it appears to me, from all I have read about it, that it is the opinion of most tacticians that the line abreast will be the line of battle, and the vessel on the flank is in the weakest position. If a swift twin-screw ram attacks a flank ship of the long type, though that ship may have superior fire she may be rammed, and there is an end of her; whereas, if the flank ship is a ram, the assailant meets his match. Then with regard to the manning question that has been noticed by a great many members who have spoken; I yield to no one in my estimate of the importance of that question. It is of equal, nay more, importance than my question, but not any question. As to the returns, I can only say they are presented to Parliament as correct. With regard to the fishermen, Mr. Holdsworth,¹ who was Secretary to the Commission on the Fisheries, states that they dislike the Navy, but they are very competent men, and if employed in torpedo-boats they would make the coast of the country perfectly inaccessible to anybody. I am only too glad that I should have called forth some remarks from Mr. Brassey, whose labours on this subject are well known. Now that he is going to occupy a responsible position, we cannot have too much confidence in one who is not only patriotic and has studied the subject of manning, but is also a practical sailor. I am much obliged to Captain Dawson for his suggestions about the experiments. The reason I have not produced any experiments from the Steam Reserve is, because those experiments are always undertaken under great disadvantage. The tides are so strong in this country that it is next to impossible for a man who has a limited time at his disposal to get at this accurately. Any practical man must know, if you have to take a ship out and run her along the mile, and bring her back in a short time, it is impossible to take accurate diagrams when the tide is running three or four knots. It is one of the most difficult things in the world. I think myself an Intelligence Department might be a useful thing. I do not produce the "Thunderer" experiments because I think they ought to govern everything, but simply because there no others approaching them in accuracy. Colonel Nugent asked a question about the 1,000 yards. Sir Astley Cooper Key some years ago said, he considered 1,200 yards the limit for effective fire of naval guns of that day. I have ventured to shorten it, because, from my experience of firing afloat, it appears to me directly you get the trajectory, or any part of it, higher than the object aimed at, there is a very great chance of missing it. Shots are very valuable in these days, and I think it will be found practically you would not do much execution beyond that distance. But I still think you must have the best gun, both on account of its perforating power and because you would not strike even up to that distance if you had not the best gun. Initial velocity appears to me to be of immense importance. I also think the question of shrapnel projectiles for naval guns is a very important one, and ought to receive great study at the hands of Officers. As to what Lieutenant Campbell and Sir Frederick Nicolson said, I should certainly wish to express in a most hearty manner my sense of the benefits of this Institution. I have received the greatest possible benefit from this Institution. If I had not had

¹ "Deep Sea Fishing and Fisheries."

the advantages which it affords by its papers, I could not have kept myself at all up to a knowledge of what is going on in the world. I consider that the Journals are most valuable here in England, and still more valuable for people on foreign stations. It is the only means of conveying to them information which, although it is well known at the Admiralty by people who have to deal with it, should be widely diffused. You never can tell who will have to act. The man who has to act may be the man who does not know anything about it, and therefore it is essential that every information that is important to the country should be diffused among all naval Officers. I am sorry my tactical names have been such a stumbling-block. I must say I feel I am only on the threshold of the subject, but I feel it is impossible to study such a subject at all, unless you institute definitions, and stick to them. Of course, the study of naval tactics on paper is quite a different thing to performing them afloat. You are not obliged to use these terms afloat; but if you attempt to talk to anybody else about the movement of two bodies, and have not got exact definitions, you find yourself in the smoke at once. I would return my best thanks to those who have helped me in this matter, and also to those who have kindly attended this meeting.

The CHAIRMAN: I am sure we should not wish to separate without returning thanks to Captain Long for the interesting paper he has read to us this day. There have been several very satisfactory incidents about it. We see the oldest Officer of Her Majesty's Navy, and some of the younger ones, meeting together here with, I hope, perfectly free discussion open to them. There has been an impression that these discussions are not favourably looked upon at head-quarters. I think any such impression may be considered as no longer existing, especially when we have the great pleasure of seeing amongst us here one who is shortly going to take his seat at the Board of Admiralty. There were several points mentioned which it is too late now to enter into. Captain Grant, I think, said that the state of the watertight compartments was very unsatisfactory in merchant ships. We need not go far to show, at all events, that one ship (the "Arizona") was saved by her watertight compartments; and I have reason to know myself, in one of the most important lines of steamers now running—the White Star—these watertight compartments are as thoroughly understood and attended to as in our own Service. I certainly did not expect that the question of manning those magnificent ships when we get them, would have been embraced in this discussion. There is no doubt it is a most important question, quite as important as the tactical aspect of the subject, but it appears to me to be a totally distinct question, and one that deserves a discussion by itself. No one would rejoice to see such a question raised more than myself, and if it should possibly be the means of retaining the Royal Marine Artillery, a very great national benefit, I believe, would be conferred upon the country.

Friday, May 21, 1880.

LIEUTENANT-COLONEL R. J. LOYD-LINDSAY, V.C., M.P., in the
Chair.

"OUR MILITIA, AND HOW TO IMPROVE IT."

By Colonel G. G. WALKER, Commanding Scottish Borderers Militia.

Introduction.—With a standing army numerically weak, and incapable of rapid expansion, as compared with the gigantic forces of the other European States, the efficiency of the Militia, as our second line of military defence, must always be an important question.

It is a question that has been often debated, both within and without these walls; for the Militia has never wanted critics; it has always been considered fair game for amateur military reformers, and in the Army itself there have been some who, in their zeal for reform, have condemned the Militia, because it did not, and could not, come up to their high ideal standard of military efficiency.

But I am bound to say that these adverse professional critics, to the honesty of whose motives I bear most willing testimony, are emphatically *not* to be found among those Officers of the Army who have been most brought into official contact with the Militia, and that that force has no more active friends and advocates than the many distinguished Officers who, in command of Districts or Sub-districts, or at the manœuvres, have made practical acquaintance with it.

Of the amateur military reformers, each of whom has a scheme, cut and dried, for abolishing everything distinctly British and national that exists in our military system, and substituting a brand new army of his own devising, framed on the model of the conquering continental army of the day, I will only say that they ignore the ruling principles of our national institutions, whether military or civil; that it is our national custom not to abolish, but to amend, to develop, to cobble, if you will, our old institutions, to fit them for the changing requirements of the times, and that, if recognizing that principle, they had employed the same energy in reforming as they have in attacking and endeavouring to abolish the Militia, they would have gone far to have made its efficiency proof against hostile criticism.

I have seen the Service which I love spoken of by a prominent Member of Parliament as "the greatest military sham in Europe;" and one of the Medallists of our own Institution here has quoted with approval, as applied to the Militia, the lines of Dryden—

"In peace a charge, in war a weak defence,"

adding—"Officered, instructed, and disciplined as it is, the Militia is

"not an available force now, and it never can become so, for the simple reason that it is raised, like the Army, on the voluntary system."

I am bound to say that this writer is pretty impartial in the contempt which he showers on organizations which do not come up to his standard; for he adds:—

"I may be reminded of the Yeomanry Cavalry. I would as soon believe in the transmutation of metals as in the transmutation of a civilian into a cavalry soldier by means of eight days' training in a year. But we have 180,000 citizen soldiers, it may be urged. I know something of the Volunteers; and my conviction is, that the only end gained by supporting them is the gratification of our national vanity. Not long ago, an Austrian Officer irreverently described them as 'a harmless joke.' They may be a joke, but they certainly are not a harmless one, for they are filling the country with an army of mock Colonels and Majors, who, if an invasion did take place, would cause incalculable harm by the tenacity with which they would cling to their relative rank."

Well, I must leave the Yeomanry and Volunteers to fight their own battles, only remarking, with reference to the Austrian Officer's sneer, that Austria, with some experience of what is, and what is not, to be expected from a most scientifically trained army, has within the last few weeks seen introduced into its Parliament a measure for forming a volunteer force, both horse and foot, substantially on the model of our own.

But, in defence of the Militia, I am content, against the adverse testimony of the essayist quoted above, to weigh the opinion of another military writer of some admitted authority.¹

The historian of the Peninsular War, speaking of our then existing standing army, says:—

"Of these, 50,000 or 60,000 were employed in the Colonies and India; the remainder were disposable, because from 80,000 to 100,000 Militia, differing from the regular troops in nothing but the name, were sufficient for the home duties."

That this was also the opinion of those who carried that great struggle to its issue, may be gathered from the following extract from a speech by Lord Castlereagh,² in November, 1813, in which he says:—

"Without the Militia . . . we could not have kept possession of Portugal, or have sent forces to co-operate in the deliverance of the Peninsula at large, and to take up that menacing position on the frontiers of France which our Army now occupies. We should have been shut up within the bounds of our insular policy, and could not have set that glorious example to other nations, or borne our share in the general exertions which have been made for the deliverance of Europe. Parliament ought, therefore, always to bear in recollection that it is to the Militia we owe the character we at present enjoy in military Europe, and that without the Militia we could not have shown that face which we have done in the Peninsula."

¹ "Napier's Peninsula," vol. i, p. 11.

² Lord Castlereagh, Nov., 1813.

Perhaps I myself owe an apology to professional critics for venturing an opinion on a military question; for I am no professional soldier, but only one of those country gentlemen who are often popularly represented as civilians, occasionally amusing themselves by playing at soldiers for a week or two; in other words, I have served in the Militia for close upon six-and-twenty years, including three years of permanent embodied service, and attendance at twenty-one consecutive annual trainings; and it so happens that though, as a Scotchman, I have served throughout in a Scottish corps, I have been attached for duty for a short time to an Irish, and for six months to an English, embodied regiment.

Although, then, or rather perhaps because, I have some practical acquaintance with my subject, I do not presume to dogmatize, and, while I hope to do something towards combating fallacies, my main desire is, not to profess my own views, but to promote discussion among those practically conversant with and interested in the subject, and so to attract to the Militia that healthy current of public opinion, from which it cannot fail to be a gainer.

The Militia from 1852.—In addressing such an assembly as the present, I am bound to remember that the interests of this practical Institution are not so much with the past as with the present and the future, and so remembering, I shall turn from what I may term the antiquarian part of my subject, and passing by the important part which the Militia has played in our constitutional history, and the great services that it rendered in that long struggle which had its glorious ending at Waterloo, I shall limit myself to dealing with the Militia as constituted under the English Act of 1852, and the Irish and Scotch Acts of 1854.

Now, I have often seen and heard the defence of the Militia, as it exists, based on the services rendered during the Crimean and Sepoy Wars; and indeed those services were neither small nor unimportant, for during the struggle with Russia, the Militia, permanently embodied, not only performed its legitimate functions by constituting itself the standing home garrison, but, going beyond the letter of their engagements, twelve regiments, out of upwards of forty that offered their services, replaced as many line battalions in our Mediterranean fortresses, while every regiment contributed its large quota of volunteers, the whole amounting to more than 30,000 men, to fill the wide gaps in the ranks of the line in the years 1855 and 1856.¹

There are probably some in this room—there must be many still serving—who saw our embodied Militia in those days. Sir de Lacy Evans, having taken note of them at Aldershot after his return from the Crimea, rather neatly epitomized his opinion afterwards in the House of Commons, by saying that the only difference he could see between them and the line was that the one wore pewter buttons and the other brass.

During the partial embodiment consequent on the Indian Mutiny, the same efficiency was much more rapidly attained: within a fortnight of their assembly, the regiments took up the duties of our

¹ Clode's "Military Forces," vol. i, p. 308.

garrisons, or were placed in brigade at our camps of instruction. Of their proficiency a few months later I heard an estimate made by the distinguished Prince who then, as now, commanded our Army in Chief.

It was at the close of a field-day in the Long Valley, in the summer of 1858, in which he had taken the personal command of twelve Militia regiments, that he called to the front and addressed a few words to the mounted Officers.

Though only a Captain then, I was acting as galloper, and was privileged to hear them; and the frank, soldierlike words with which he ended still ring in my ears—

“All I can say, gentlemen, is that I should be proud to command such a force on any service, and I feel pretty sure we should not be “licked.”

But conceding what cannot, I think, be denied, that the force at those periods attained a high measure of efficiency, the point that I wish to establish is this: that to take the conditions and performances of the Militia of that period as the measure of what should be expected of it, should the country be again involved in a great war, is to take a view absolutely erroneous and misleading, is to adopt one of those half-truths which are almost more misguiding than positive fiction. And, in order to prove my case, I must ask you to go back with me, and glance at the condition of the Militia just prior to the Crimean War.

Sketch of Inefficiency of Militia before 1854.—Very ample provision for maintaining the force had been made at the close of the great war; a strong permanent staff was retained, and annual trainings were provided for. But, as years rolled on, the memories of war grew faint; twice only between 1815 and 1852 was any attempt made at an annual training; each year saw some further reduction in the number of the permanent staff; still later, all the arms and accoutrements were called in, to equip the Spanish soldiers of Queen Christina for a cruel civil war; and so, when the nineteenth century had run just half its course, our Militia was represented by an Adjutant per regiment, too often an infirm old man, and one sergeant per company, many of them as infirm or more infirm than the Adjutant, many of whom had never served in the line, and no one of whom probably had ever seen on parade the regiment to which he nominally belonged.

True, there appeared in the Army List the names of certain gentlemen who purported to be Officers in these shadowy battalions: of these some few were venerable relics of the old war, some very few were men who, having served in the Army, accepted commissions in the Militia on succeeding to the paternal acres; but most were country gentlemen holding nominal rank in a practically non-existent force, partly as a matter of county tradition, partly also moved by the title to wear a uniform and to hold, as it were, a diploma of some social standing. And if any of these gentlemen were possessed with any ambition to fit themselves for performing the duties which were titularly theirs, they were absolutely without the means of acquiring any knowledge of them.

And so it was that when, about 1850, the nation became possessed with an uneasy sense and forecast of its exceeding unreadiness for war, and it set itself to rummage in its old armouries, it found that it had a Militia only in name.

The English Act of 1852 was the first attempt at a revival: under that Act, power was taken to raise 80,000 men, of whom 50,000 in 1852, the remainder in 1853. But though an Act of Parliament is supposed to be omnipotent, we learnt to our cost that it could not create an efficient military force in one year or two; for though 57 regiments were trained in 1852, and 88 in 1853, yet, Officers, non-commissioned officers and men all starting alike from one uniform base of absolute ignorance of drill, discipline, and subordination, the progress made was lame and halting. I was myself a careful observer, prior to the Crimean War, of more than one training in what was considered rather a crack Militia regiment, and words altogether fail to describe the gulf between the efficiency of the force then and that of the most hopelessly distanced Militia corps of the present day.

But be it observed, that so far, I have spoken only of the *English* Militia; and this for the sufficient reason that the Scotch and Irish forces did not exist, the Acts reconstituting them having only been passed in 1854, subsequent to the declaration of war.

Practically, then, we entered on that great struggle, supported by the *English* Militia alone, numbering in fact less than 60,000 of all ranks, of whom some had no training at all, some had had twenty-eight days, and not one more than fifty-six.

And even these were only embodied, not all at once on the outbreak of war, but by slow degrees, as the gravity of the struggle forced itself on our unwilling minds.

But it was not till February, 1855, that the first Irish and Scotch regiment was called out.

Permit me to read an account written by an eye-witness, of the first muster of one of them.

"It would be difficult to imagine anything more cheerless or depressing than the muster-parade of the regiment on February 1st, 1855. There was a bitter frost, with heavy snow, for the winter was a hard one elsewhere than on the ridges around Sebastopol. As the morning wore on, groups of dingy looking men and lads gathered about the street corners, and, shivering and smoking, awaited what should come, with a dull mixture of distrust and curiosity. A dirty room, approached through a back yard, served as orderly room, and here were made such preparations as might be for our first parade. At 10 A.M., two improvised buglers in plain clothes sounded some imitation of the 'assembly' on two battered cornopeans. The Colonel, with the Adjutant, and the few Officers who had as yet joined, descended into the street, and aided the staff-sergeants, of whom just half were inefficient from age and infirmity, to lead and hustle the mob into some semblance of a column. It was no easy task; but we succeeded after a fashion. . . . The spectacle was a sorry one; of the Officers, two only, the Colonel and the Adjutant, were in uniform; five or six of the staff wore the antiquated coatee

"with wings, the remainder and the whole of the rank and file were in plain clothes, and such plain clothes, some of them! 262 rank and file only answered to their names out of 334 enrolled. There were many stout fellows and promising lads among them, but too large a proportion of weeds, and clumsy, awkward men, too old and set to be moulded into soldiers; drill and discipline were mysteries to all. Nor were the means of imparting them abundant. The Commanding Officer had indeed recently retired from the Indian Army, in which he had attained the rank of Major, and the Adjutant had served in the line. Of the four Captains present, one had served as an Ensign in the line, and one had been attached for drill for one month to the Scots Fusilier Guards. Of the subalterns, one, a veteran of about 70 years of age, had several years' embodied service in the regiment during the Peninsular War. The remaining Officers were all absolute novices. One trouble we were spared; there was no embarrassment about the issue of arms, clothing, necessities, or stores, for the simple reason that there were none to issue. Six ancient sergeants' fusils, with flint locks, were the only arms in our possession, and though, after the first few days, dribblets of clothes and other supplies began to filter in, it was over six weeks before the men were all clothed, and considerably longer before they were armed."

Well, I ask you to remember that the muster above described took place nearly three months after Inkermann, that it was, I believe, the first Scottish or Irish regiment mustered. I ask you to further recall the sketch I have given of the inefficient state of the English portion of the force; and then I ask whether I am not justified in saying that, so far from the performance of the Militia during the Crimean War being accepted as the standard of its value in the future, it is not more just to say that the want at that time of a strong Militia was not the least important cause of our barren successes, and of our sore disasters, and that the history of those campaigns might have had to be re-written, if at the outbreak of hostilities, our Army had at its back, not the weak, raw force I have endeavoured to describe, but a solid, well-trained Militia, 100,000 strong, able at once to contribute 30,000 bayonets to our first line, and to take over, not after a delay of months, but at a week's notice, the whole garrison duty, both of Great Britain and the Mediterranean.

The following table brings out in pretty clear relief the merely numerical difference between the force in 1854 and that in 1880. I have given the establishment of the Militia by companies, as well as by corps, because the latter are of various strengths, and were even more so in 1854.

	1854.	1880.
Battalions, Infantry	81	136
Corps, Artillery	10	33
Do., Engineers	0	3
	—	—
Total	91	

	1854.	1880.
Companies (all three arms combined).....	714	1,228
Establishment (exclusive of Officers and Staff)..	80,000	130,000
Number of combatant Officers, actually serving..	1,867	3,436
Number of all ranks actually present at training (not ascertained, say)	60,000	113,284

But though the foregoing figures give some idea of the great disparity in mere *numerical strength* at the two periods, it is impossible to tabulate the disparity in *efficiency*. I have shown that the force of 1854 was practically a new creation, and almost entirely untrained. But the force of 1880 is composed of corps whose regimental systems have been formed for a quarter of a century, whose ranks contain many men of from five to twenty years' service, and contain not one, with the exception of this year's recruits, who has not gone through a course of preliminary drill, besides at least one annual training. The staffs have been largely increased since 1854, and are composed of picked veterans from the line.

I shall be told that the officering of the Militia is a weak point; but I would point out that even the utterly untrained body of English gentlemen who undertook the work in 1854 acquitted themselves well, and rapidly brought the force to a state of efficiency.

But again, contrast 1854 with 1880. I do not exaggerate in saying that the Militia subaltern of the present date, who has undergone one preliminary drill and one training with his regiment, is an infinitely better instructed Officer than, I will not say every subaltern, or every Captain, but every Field Officer of 1854, excepting, of course, the very limited number that had served in the line. With rare exceptions, exceptions that can now never recur, the men who now command regiments or companies in the Militia have either served previously in the line, or, after service in the junior grades, have proved their fitness for promotion before a Board composed of Officers of the regular Army.

To those who look on Militia Officers as incompetent amateurs, it may be news that, including Adjutants, 645 of the combatant Officers have served in the regular forces, and that 593 more hold certificates from the schools of instruction, testifying their fitness to command either a battalion or a company; this, allowing for 41 Officers who, having served in the line, also hold school certificates, gives a total of 1,197 Officers whose qualifications for command go beyond what they have acquired in the performance of their regimental duty.

This calculation, moreover, takes no account of the very large number of Officers who have been attached for instruction to line regiments or brigade depôts, neither does it include the numerous Officers holding certificates from the School of Musketry, there being nothing in the Army List to verify the fact, unless they are actually serving as regimental instructors; nor does it reckon the still considerable number who were embodied for long periods, from 1854 to 1860.

And further, I am sure that many Commanding Officers will bear me out in the remark that there are in most regiments men, not included in any of the above categories, but who have made them-

selves masters of their work by sheer labour and the love of the thing, and who are not the least valuable aids to the efficiency of their corps.

But now, passing from comparisons between the Militia of the present and of the past, let us endeavour to form a dispassionate estimate of its actual military value.

To say that it is, and in many respects must be, inferior to the line, or to reserves composed wholly of men who have served in the line, is to state a truism.

But, again, to state that, because it is thus inferior, it has no military value at all, is to state, I venture to think, a fallacy, founded on professional pedantry, and opposed to the facts of history. Inferiority is a question of degree, with no hard and fast line with efficiency on one side and inefficiency on the other. I have seen the Militia condemned as useless, on the ground of some supposed analogy between it and the Garde Mobile of France, which went down before the victorious Army of Germany. I have no time to show in detail the utter fallacy of such an analogy. Suffice it to say that in every single point in which our Militia is strong, the Garde Mobile was weakness itself. It was emphatically a new force, created, on paper only for the most part, by Marshal Niel, after the Prusso-Austrian War of 1866; the greater part of it had never been trained at all, the training of the few was of the most trivial character, it being expressly enjoined that the men were never to be kept from their homes for more than one night at a time; it was hopelessly wanting in regimental system, in trained Officers and experienced instructors; it was honeycombed with insubordination, and it was fatally deprived of the one condition which might conceivably have produced order out of chaos, by the fatal decree which, giving to each corps the right to elect its own Officers, made commissions the prize of intrigue, and struck at the very root of discipline. In every single point our Militia differs from such a force as light from darkness. It is an ancient force, with traditions and regimental histories which it cherishes. It has been carefully trained for very many continuous years; its regimental system, based on that of the line, is firmly established; its Officers, selected from precisely the same class as Officers of the line, are nominated by the Crown, and all the senior ones, by years of service, have learnt to know both their duty and their men; it has a numerically strong and carefully selected body of instructors in the permanent staff, and I am bold to say that it is thoroughly permeated with the spirit of discipline and subordination. If anyone doubts this let him, remembering that there is one and the same military law for the line and the Militia, inquire into the number of courts-martial and of minor punishments in the Militia, and, if he thinks that offences are screened and indiscipline winked at, I would remind him that for many years the Militia was trained wholly in billets. The temptations to irregularity and indiscipline incident to such a state of things are known to all; they are trying to the best disciplined regular regiment. Yet the conduct of the Militia during these years of trial has, as a rule, been excellent, and you might almost count on the fingers of one hand the cases of serious riot and

disturbance that have occurred in the last five-and-twenty years. The Militia moreover has one special merit, which is too often ignored, and yet is of immense practical value: it is, what cannot be said of many reserve forces, always and easily available. We know, for instance, what a serious question it was for Prussia in 1866, as to what spirit the nation would receive the order for mobilizing the Landwehr; or, to look nearer home, we know what a wrench would be given to business, commerce, and labour, of every kind, by calling out any considerable portion of our fine Volunteer force for even twelve or fourteen days.

But the Militia is perfectly habituated to being summoned to arms for considerable consecutive periods, and accepts it as a condition of its existence. Not only is it annually trained for four consecutive weeks, but that period can be prolonged, if necessary, without creating the smallest dissatisfaction. The corps taking part in the manoeuvres of 1872 and 1873 had their training prolonged to six weeks, and were looked on with considerable envy in consequence by other corps, and, in 1878, the Militia Reserve men obeyed the order for mobilization without a murmur.

Now, I call special attention to the value to the State of this constant readiness for continuous service on the part of the Militia.

Suppose at this moment a critical condition of foreign affairs, requiring vigilance and preparation: Government has only to call the force out for training, and they have at once about 120,000 men under arms. Suppose the state of tension to continue, they can prolong the period of training to its full legal limit of fifty-six days, during each one of which, the force will be growing rapidly in efficiency. And still they hold in their hand the "*coup de maître*," for at any moment they can issue the order for embodiment, on which each corps would become a regular regiment for service in the United Kingdom.

We know also, from experience, that the Militia can not only be depended on for permanent embodied service for an indefinite number of years, but that it is ready voluntarily to extend its service to foreign countries, and that, when it is no longer required, it can be at once and easily disbanded, leaving no permanent charge, or next to none, for non-effective service.

It is, moreover, a force which not only is formidable and capable of work on its first assembly, but is also one that does not require to be pulled to pieces and reconstructed for permanent employment, because its instruction is rather incomplete than faulty in principle, so that each day that it is kept together, it gains in cohesion and military strength, building on the sound and solid foundation already laid.

I venture, then, to affirm that the Militia, without pretending to equal our own line, or the reserves of countries which adopt universal compulsory service as the basis of their military systems, has a strength and solidity and merits of its own; that, often called upon, it has never been found wanting, and has never failed to do all, and far more than all, that could legally be demanded of it; that it is the most military auxiliary force that could be created in this country without conscription; and that, should we ever be driven by stress of weather to adopt compulsory service, then, in the sound regimental

system, in the strong *esprit de corps*, in the seasoned permanent staff of the Militia, we should find the fittest mould into which to fuse the raw material, destined to form our home army of the future.

But I should have shot beside my mark if, in anything I have hitherto stated, I had conveyed or appeared to convey the idea that, in my opinion, the Militia was susceptible of no improvement. All military forces must move on, or be left stranded, and the Militia is no exception.

In considering, however, the reforms desirable and possible, ardent advocates of changes are apt to forget sometimes that the force might be reformed to death. Nothing is so common, for instance, as the suggestion to train Militia recruits for twelve months, or to insist on their serving one year, or two, in the line, before joining the Militia at all. Most desirable objects, doubtless, if attainable; but all this class of suggestions ignores one fact, too patent to be denied, that, to use a plain proverb, you must "cut your coat according to your cloth;" that, under our voluntary system of enlistment, you must take, not what you could wish, but what you can get; that there is a large and militarily valuable class of our male population that will serve in the Militia, and that will not serve in the line; and that, in laying down the conditions of service in the former, you must take care that you don't make them so stringent as to leave in the eyes of that class little distinction between the two. The men who, for the most part, fill the ranks of the Militia don't care for soldiering permanently in peace time. They take kindly to the annual training as a pleasant variety from the work-a-day toil of daily life, and I am bound to say the amount of hard work they will undergo, in the way of drill, cheerfully and without murmuring, is astonishing. They have a very strong feeling of pride in and attachment to their regiments, and would serve in them cheerfully on embodiment at a time of national danger; but I venture to say very confidently that, were the whole Militia force disbanded to-morrow, but a very small minority would enlist in the line. I know well that some hold an opposite theory, and maintain that the Militia is a rival and antagonist to the regular Army, because both are drawn from the same social strata. But they overlook the consideration that, though the class may be identical, the motive influencing the members of that class may be different, just as one young man may go into the cavalry and another take a yeomanry commission, with absolutely different aims and views, though both belonging to precisely the same social class. Moreover, the theory flies in the face of fact. During Lord de Grey and Ripon's administration at the War Office, Militia recruiting was to a great extent suspended, in order, by reducing the numbers, to admit of the training, which had been injudiciously reduced to twenty-one days, being, without additional cost, extended to twenty-eight. According to the theory, that period should have been one of exceptional activity in line recruiting; so far from it, it was coincident with a decrease of line recruiting so alarming as to necessitate the appointment of that Royal Commission which successfully recommended large additions to the pay, allowances, and comforts of the soldier. As a fact, the Militia

soldier can, at any moment, transfer himself to the line; that he does not, proves that he does not wish to do so, though a certain proportion who do so, form a very valuable addition to the regular Army.

The contributions of the Militia to the line were, in—

1877.....	8,849
1878.....	7,748
1879.....	7,157

I can give yet another proof; I can remember three Militia regiments being ordered for disembodiment at Aldershot in 1858. As reinforcements were urgently required for the regiments serving in the Sepoy War, they were called on to give volunteers for the line immediately before their departure; and it was hoped that, as the men had been absent from their homes and civil employments, and had been practically soldiers for many months, many at least of their number would permanently adopt the profession of arms. But the hope was disappointed, for just four men out of the three regiments tendered their services.

Take, again, the case of the Militia Reserve men in 1878. They responded to the call for mobilization, I will not say cheerfully, but with enthusiasm, and with singularly few defaulters, considering the very slight hold on them, as compared with the men of the Army Reserve (who, by absenting themselves, sacrificed a substantial amount of yearly pay), and they cheerfully joined their linked line battalions, serving in their ranks for between two and three months.

When the crisis was over, they had the option of remaining soldiers by volunteering for the line, or of returning to their homes and their Militia regiments, at a time of failing trade and of depressed agriculture. They had cut adrift for a time from the occupations of civil life, they had ceased to be raw recruits, and were at home in their new corps, yet very few indeed elected to remain; the vast majority preferred in peace time to serve in their own Militia regiments. In my own regiment, 244 men joined the linked line battalion: they were most kindly treated, being placed in the ranks at once, and many of the non-commissioned officers being allowed to retain their stripes; yet, of that number, every single man, except one poor fellow who was accidentally drowned in the Liffey, marched back into my barrack-yard, when the reserves were dismissed under the command of the Colonel of the linked line battalion, who took the trouble to come from Dublin to express his high opinion of them.

Largely, then, to increase the length of training would, I maintain, not only involve serious cost, but would tend to deter from joining many of the class who now fill the ranks; but I can see no reason why eight weeks' preliminary drill, in addition to the training, should not be exacted from each recruit. To ground him thoroughly at first is the main point; and twelve weeks, well employed, would do wonders with him. He is generally a lad of from seventeen to twenty years of age, at which period his labour is of far less value to himself than in later life, and he learns both cheerfully and rapidly. That, then, is the time to make the most of him. I doubt the advantage of drilling him

with line recruits; working against time, as we do, we exact more drill than is usually done in the line; and, besides, a man cannot begin too soon to be at home in his own corps. I am aware that some commanding Officers hesitate to extend the preliminary drill through fear of checking recruiting; but, so far as my own experience goes, extending over a period of six years, during which the full period of eight weeks' preliminary drill, in addition to the training, has always been exacted, that apprehension is groundless; and I should, therefore, gladly see the present permissive system replaced by the distinct order that, except in special cases, duly stated by the commanding Officer and endorsed by the Officer commanding the sub-district, the recruit in his first year of service shall have not less than 83 days' consecutive drill.

While, for the reasons above stated, I shrink from any large extension of the training period, I think still that a small step might be taken in that direction, with great advantage and at no risk.

No one probably will deny, what has been both officially affirmed and acted on, that the occasional participation of the Militia in brigade and divisional manœuvres is most beneficial to the force; I can myself testify to the gain resulting from a regiment taking part in the autumn manœuvres. At the same time, I hold that this should not be done to the exclusion of steady elementary drill. That training in brigade or division should not be the substitute for, but the supplement of squad, and company, and battalion, and musketry drill; and that, to take Militia regiments on the first day of their training and incorporate them in armies, making them take part in extended manœuvres, before they had had an hour of steady, elementary work, as was done in the experimental mobilization of the 2nd Army Corps in 1878, savours too much of teaching men to run before they can walk; and I hold that far more instruction could be afforded by assembling the Militia merely in brigades and divisions, as the larger the force collected the less amount of careful, steady drill can be performed, and the greater amount of time must of necessity be devoted to far-reaching manœuvres, during which a regiment may often spend whole days in column of route or quarter column.

I would suggest, then, that every fourth year the training of each regiment should be extended to six weeks; the first additional week to be spent in brigade, the second in divisions, either with line or other Militia regiments.

Not only, I believe, would very great progress thus be made in manœuvring power, but a healthy spirit of rivalry between corps would be stimulated, and much would be done to mould the Militia, which is now rather an aggregation of isolated regiments, into a homogeneous force.

Musketry.—The proper use of his rifle is the chief duty of the infantry soldier; and I am bound to confess that we Commanding Officers of Militia, anxious to make the best appearance at inspection, always hard pressed for time, and liable, at least till very recently, to be inspected by Officers of the old school, to whom musketry was an abomination, have not always made the most of the very meagre

means at our disposal. As, however, a new system of musketry instruction for the Militia has recently been decided on, and I am not yet in possession of its details, I forbear from offering suggestions.

But this much I will say, that no plan will or can be successful which ignores the necessity of each regiment possessing *in itself* the means of imparting instruction, and which leaves the training of the soldier in his main duty to be dependent on the chance of being able to borrow a qualified Officer from the line—a chance precarious at all times, and certain to fail in the pressing necessity of a war.

Yet, at this moment, of our 136 infantry battalions, 67 only, or not quite one-half, have qualified instructors; and of these 67, no less than 45 are Captains, holding what is a subaltern's appointment, presumably because there are no subalterns qualified to replace them.

This is a grave shortcoming; and knowing, as I do, the excellent class of young men now joining the Militia as Officers, I cannot but believe that, were it understood that no regiment without a qualified instructor would be considered efficient, the blank would soon be filled.

I admit that the duty of the instructor is hard and inadequately required. I have never been able to see why, while an Officer holding a school certificate has "P. S." appended to his name, an Officer who goes through the longer and more severe labour of securing a first class certificate at Hythe should have no similar recognition. I will go further, and say that, while the deficiency of Musketry Instructors is so lamentable, and while, also, the numbers attending the Schools of Instruction are so limited, it might be worth considering whether, as an encouragement to zeal, the possession of a Hythe or school certificate might not be allowed to reckon for a year towards the attainment of honorary rank. I am not blind to the demerits of the "honorary "rank" system; but while it exists, and is the only prize or reward open to the Militia, it certainly would not suffer from the recognition of zeal and intelligence, as well as of mere length of service.

Quarters.—Speaking from long experience, I maintain that there is no comparison between the efficiency that can be attained in billets and in camp or barracks. It is not merely a question of drill, though in this too the gain is great; in the far weightier matters of discipline and subordination, the billeting system must comparatively fail; the day's drill once over, the men are virtually their own masters, and pass from the control and presence of their Officers; in camp or barracks, discipline is in the air, the soldier is learning something every waking hour, and the time that in billets is loitered away in the tavern, or at the street corner, is spent on camp duties, or in games and healthy exercise. Guards, piquets, fatigues, cooking, tent-pitching, a hundred things which go to make a soldier, and are practically unattainable in billets, are matters of hourly necessity in quarters. There too the Officers are in contact with, and can interest themselves in their men, and what is of great importance, the non-commissioned officers not on the staff, instead of losing caste by herding with the men, as they must do in billets, can and must assert their position, not merely on parade, but in the daily life and interior economy of the

regiment, and find themselves promoted in the social scale by joining the sergeants' mess. I am aware that some view camp life with apprehension for the health of the men, but I may say that, having trained under canvas for ten consecutive years in the south-west of Scotland, which is not a proverbially dry climate, I have found no prejudicial effects, either to health or recruiting, and the numbers in hospital have been smaller than in billets.

Officers.—While not admitting that the Officers are the untrained body they are sometimes represented, I would gladly see more opportunities afforded them for learning their duty. The present system, under which, while Officers have to prove their fitness for promotion before Boards composed of Officers of the regular Army, it is left optional to attain that efficiency either by attending the preliminary drill of their own regiments, or by being attached to line regiments or depôts, appears to me wrong, as weakening the regimental system. An Officer's first article of faith should be a fanatical belief in his own regiment; how can he attain this, if trained in another, and so led to believe that his own is not able to instruct him in the rudiments of his duty? His own commanding Officer and his own Adjutant have the interest, which the commanding Officer and Adjutant of a strange service, and a strange corps *cannot* have, in making him efficient; moreover with his own regiment, besides mere drill, he learns the regimental system, he becomes acquainted with his brother Officers and with the staff, and with the character and dialect of the men, becomes in fact one of the regimental family. And I don't hesitate to say that the young Officer will have to do far more work, and will have generally far more opportunities of learning his duty at the preliminary drill of his own regiment than either at a brigade depôt, or with a line regiment, on its present attenuated home establishment.

Instead then of the present arrangement, I should prefer the simple rule that the recruit Officer, like the recruit private, should commence his service by twelve consecutive weeks' work with his own regiment.

I think that the commanders of districts and sub-districts might do a good deal to promote zeal and efficiency among young Militia Officers by employing them much more frequently than they do as gallopers; there is nothing so useful to a young Officer, and nothing so difficult to attain, especially in the Militia, as to see something of drill, *outside his own regiment*. I frequently see General Officers and Colonels of sub-districts conducting inspections on reviews with either one Staff Officer or none at all, and I am sure that in many cases at least the Militia regiment of the district, if applied to, could supply a galloper with great advantage both to the Inspecting Officer and to himself. I think also that some opportunities might be afforded to Militia Officers to attend the autumn manœuvres, otherwise than as mere civilian spectators.

Schools of Instruction.—The only means of improving themselves in professional knowledge open to them, outside their own regiments, consists in fact of the schools of instruction. So far as they go, they are excellent, and, having passed a large number of Officers through

them, I can speak most favourably of the system pursued, and of the results obtained, especially at the Wellington Barracks School, with which I am most familiar; and I heartily wish that a larger number of Militia Officers availed themselves of them. To any one who knows the strictness of the examinations, the possession of a school certificate is a guarantee that the Officer holding it, has gone far towards making himself master of his work, so far as a mere knowledge of drill goes, and that he only requires experience and common sense to put it to practical use; and nothing would so tend to raise the Militia in public opinion, as the knowledge that all, or a large proportion of its Officers, had thus given public proof of their efficiency.

At the same time, holding as I do that a young Officer's first and best school is his own regiment, I should be glad to see the course of instruction at the schools made less rudimentary, and to embrace, as far as possible, those subjects with which it is difficult, owing to want of time and other causes, to deal during the limited period of a regimental training.

Insisting that the young Officer joining the school should already with his own regiment have mastered the rudiments of mere drill, I would devote the school course rather to such subjects as outpost duty, reconnoitring, hasty field fortification and intrenching, signalling, and the intelligent reading of the features of field maps. Were the course extended to six weeks, a young man of ordinary intelligence and application ought to get a good deal more than a mere superficial knowledge of these important subjects in that time. I cannot but think that it would be well worth while, not, as at present, practically to deter young Officers from attending the schools by giving them only five shillings a day, or nothing at all should they have already attended the preliminary drill of their own regiments, which practically entails very heavy personal expense, but to allow them the full pay and allowances of their rank. Were this done, commanding Officers would not feel that they were imposing a hardship, as they do now, in insisting on their young Officers attending the schools.

Non-commissioned officers not on the Staff.—Differing, I know, from some, I hold that a very fair amount of efficiency can be secured among the non-commissioned officers, if they can be annually trained for twenty-eight days prior to the assembly of their regiments, and if they are not in billets. But the inducements to them to do so, limited to a few coppers more a day than those received by the private, for at the most eight weeks, are inadequate to tempt from the well-paid civil employment which they can command, the intelligent class you require. I believe an additional annual bounty of 1*l.* for a sergeant, and of 10*s.* for a corporal, would go far towards bringing better men forward, and to make the stripes more an object of ambition than they are at present.

Clothing.—I would strongly advocate the issue of the helmet to the Militia. It is very hard for them to feel that pride which they ought to do in the service, when they have to parade in undress in brigade, as they frequently have to do, with both regular and volunteer troops wearing the helmet; and the Glengarry, though an admirable fatigues

cap, is unsuited for general service wear from having no protection either for the eyes or the back of the head and neck. Flannel should also be substituted for cotton shirts, which have long been discontinued in the line, and which are specially comfortless for men training under canvas, and consequently spending much of their time in their shirt-sleeves in the open air.

I venture to think, too, that now that the Militia has been so closely connected with the line, its uniform should rather be assimilated to that of the latter than to that of the Volunteers,—a service regulated on entirely different principles.

Equipment.—Believing, as I do, that the British infantry soldier is too valuable an animal to be used as a beast of burden, and that any spare carrying power he may have should be devoted rather to extra ammunition than to the numerous and to some extent dispensable articles that he carries in his valise or pack, I do not advocate the issue of the valise; the knapsack serves as a portmanteau for ordinary service; for active work the havresack and a few articles in the great coat, rolled *en bandoulière*, should suffice. But the want of proper ammunition-pouches should be at once rectified. And I cannot see why water bottles, which doubtless are stored somewhere in sufficient quantities, should not be kept in the Militia stores instead of some central magazine. Economy of storage would be secured, as well as much confusion and delay in issue avoided, if regiments had in their own possession the various necessary articles of equipment.

I was astonished last year, on applying for tools to complete the equipment of my pioneers, to be informed that they no longer formed part of our equipment, and that the pioneers were in future to be armed and equipped as rank and file. I trust that in these days, when the use of the axe and spade are recognised, this rule may be reconsidered; the more so, as every Militia regiment probably contains a considerable number of artificers, who may be said to be pioneers ready made.

Arms.—The Snider-Enfield is a good, solid, fairly-accurate soldier's weapon; but the inconvenience of having two arms and ammunitions for troops forming part of the same brigades and divisions, and who individually are constantly passing from one service to the other, is so obvious that I hope soon to see the Henry-Martini in the hands of both. Its counterpart, the Peabody, did terrific execution, and was not found liable to disarrangement in the hands of the almost absolutely untrained Turkish levies, even in exceptionally severe weather. The Henry-Martini has been adopted as our military arm for many years; we have at Enfield a factory capable I believe, with pressure, of turning out some 2,000 or 3,000 a week; we have the whole private trade of the country open to us, and I do not see why this rich country should not have been able to do in six years what semi-barbarous and bankrupt Turkey did in one, namely, put the best available weapon into the hands of all its troops. I was much struck, in studying the masterly retreat of General Vinoy's column after the disaster of Sedan, by reading that during his forced halt at Mézières, within hearing of the cannonade of the great struggle, his reserve men, recently incor-

porated in the ranks, were receiving their first lessons with the Chassepôt on the glacis.

This is precisely what would happen, and what ought by no possibility to be allowed to happen, were our Militia Reserve men suddenly called on for service, or were the Militia hastily supplied on an emergency with the new arm. If I am told the arms are ready in store, I say they should be in the Militia stores, and non-commissioned officers and men should be thoroughly drilled in their use. Otherwise, were the evil day to come, there will be the choice of two alternatives, almost equally unsatisfactory, either to have two weapons and two varieties of ammunition in the same force, or to have a large portion of the force armed with a weapon of the use of which they are ignorant.

Should it be objected that the Militia are as yet too untrained in musketry for the adoption of the Henry-Martini, I would remark that the extreme flatness of its trajectory, rendering distance-judging almost unnecessary up to 800 yards, is a strong argument for its adoption.

Militia Artillery.—As myself an infantry man, I have perhaps little right to refer to the artillery branch of the Militia service. Yet, when I look in the Army List at the immense array of Volunteer Artillery, remembering too how fitted these corps are in many cases from their local character for garrison duty, and when in the same Army List I see that, in the mobilization scheme, 32 field batteries are wanting to complete the eight army corps, I cannot help wishing that some portion at least of our Militia artillery could be in some way mobilized. To convert them into field batteries, properly so called, would probably present insuperable difficulties; but I think it might be possible to convert a portion at least into batteries of position, armed with the 40-pr. gun. If care were taken to enlist artificers and men accustomed to the management of horses, and to select the staff from men who had served in the field batteries, it would, I believe, be easy on an emergency to purchase the number of powerful draught horses necessary for their transport, and equally easy, in a country abounding in good roads, to keep the guns well to the front. Peel's Naval Brigade in India must have been short enough of trained drivers, and they had to work in a country, as compared with our own, signally deficient in roads and powerful draught cattle. Yet their heavy guns were always well up, and were used with crushing effect. Were only one such heavy battery experimentally organized for each of the eight army corps, it would go at least some length in making up their admitted deficiency in artillery.

Militia Engineers.—Though the creation of Militia engineers has hardly yet gone beyond the length of experiment, I believe the experiment has been so far successful, and, while it is doubtless impossible in an auxiliary service to create a corps possessing all the varied scientific acquirements of the Royal Engineers, there ought to be no insuperable difficulty, especially in a country abounding, as ours does, with skilled artificers, in producing corps which, like the Musbee Sikh Pioneers, whose praises in the present and in former campaigns

are on all men's lips, should be able to destroy or repair roads and railways, to bridge rivers, to throw up hasty field fortifications, and, having done so, to defend them.

The addition of one such corps to each of the eight army corps would, I think, be highly advantageous. But, considering the rapid increase of our population, it would seem right and desirable to provide them, rather by the creation of new corps in those great centres of industry where skilled labour is to be found in the greatest abundance, than by the conversion of existing regiments.

Want of time has compelled me to eliminate from my lecture many important points on which I had written. The Militia Reserve system partakes too much of that baneful plan of cutting off the top of the blanket in order to sew it on to the bottom, which is too painfully familiar to the line. There the evil of wrecking the efficiency of one regiment in order to fill up another for active service, has of late been brought into fearful prominence. But then, at least, each line regiment may hope to have its turn at the expense of its neighbours. In the Militia, there is no hope of such compensation; at the moment when real service seems possible, and a regiment sees some hope of showing what it is worth, its reserve men, comprising from one-fourth to one-third of its strength, and probably a great majority of the non-commissioned officers, are marched off to swell the ranks of another corps. And to complete the consequent disorganization, it is now sought, by throwing open the Reserve of Officers to the Militia, to deprive regiments at the same critical moment of some of their most active and zealous Officers.

There are many other points, such as fraudulent enlistment, the position and pay of the permanent staff, the friction that undoubtedly exists under the present system between the Brigade Depot and the Militia regiments comprised in it, which I trust may be handled in the subsequent discussion. The reforms I have suggested are few and modest, because I know that large ones, involving heavy cost, are impracticable, and because, also, I believe the Militia to have advanced already so far on the road to efficiency, that were even modest proposals adopted, the country would have, and would know that they had, in the Militia, a force that could be depended upon.

But there is one change of very great importance which I would strongly advocate.

The history of the Militia has been one of steady development; from being a purely civil and local, almost a parochial force, it has grown to be a force absolutely military, governed by the same laws, administered by the same Staff, commanded by the same General Officers as the regular Army; it becomes itself, when required, the home Army, and it is perfectly understood that, if required, it will not limit itself to home service. Well, I think the time has come when the Militia should make another advance, that its availability for more extended service should be recognized and systematized, and this is all the more possible and desirable now, when we have in our Volunteers a force that could, to some extent at least, in case of pressing necessity, supply the requirements of home garrison duty.

I should wish, therefore, in future, to see all Militia recruits enlisted, subject to the liability for garrison duty in Europe, in the Mediterranean, or in British North America, in case of war, or imminent danger of war. I do not believe this would have any adverse effect on recruiting, and I believe that for a very small bounty, the great mass of men now serving would volunteer for the more extended service.

For, in case of a great war, such as would render the services of the Militia abroad desirable, their permanent embodiment at home would be a certainty, and, once embodied and moved from his native country, it matters little to the Militia soldier whether he serves at Portsmouth or at Malta.

I would moreover add, that if it be true, as I hope it is, that the Imperial and Canadian Governments are considering how, in case of war, a portion of our Canadian Militia can be made available for general service, it is only right and fitting that the Militia of the old country should set the example of extending its liabilities for work.

The immense accession to our military strength consequent on such an extension of Militia service is obvious; doubtless, without such extension, the Militia would in the future, as in the past, offer themselves for foreign service. But in modern war, time is an all-important factor. At present, before a regiment can volunteer for foreign service, it must be assembled; when assembled, it may or may not respond to the appeal; whereas, under the system I propose, the regiments required for foreign service might be designated beforehand; a telegram would suffice to embody them for foreign service. Within twelve hours of assembling, they might be on their way to the port of embarkation, and the transports that conveyed them to their destined garrison might carry on to the scene of operations the line regiments they had replaced.¹

The usefulness of the arrangement would by no means be exhausted, when we had replaced the garrisons of Cyprus, Malta, Gibraltar, and Halifax. You would further have it in your power to strengthen your base and point of debarkation, wherever you had determined to strike with your active army, by an intrenched camp, held by any required number of Militia, both infantry and artillery. As an illustration, consider how different our position before Sebastopol would have been, could we have had even one strong division of Militia at Balaclava, setting free, for service at the front, the too weak force that covered our right flank and rear, undertaking all the duties of "Etappen" troops, supplying strong working parties for landing stores, and furnishing, say, 1,000 men daily, for repairing and improving the communications between the port and the trenches.

It may be objected, that to place imperfectly trained troops in positions where they might be brought into collision with a better trained army, would be dangerous. Let it be admitted, that to pit the Militia, battalion per battalion, against the regular army of an enemy in the open field, would be to risk disaster; but why do so?

¹ "Journal of the Royal United Service Institution," vol. xxiii, p. 985.

It was not thus that Wellington used his auxiliaries (and he had them of many kinds, Native Indian troops, Portuguese Militia, Spanish guerillas,¹ raw Dutch and Belgian and German levies). Yet he did use them with success, and he could not have succeeded without them. Brigaded in due proportion with the line, and supported by powerful artillery, the Militia would have to be reckoned with, even now, as a manœuvring force in the field. Those who, having studied the story of Plevna and of the remarkable defeat inflicted last August by the Turkomans at Denghil-tepeh on the force of General Lomakin, believe that in an intrenched position our Militia would afford any enemy an easy or a bloodless conquest, take, I think, too mean a measure of the courage and the fighting qualities of their countrymen.

I will conclude by expressing my firm belief that the Militia is not an old worn-out tool that may be lightly flung aside, on the chance of finding a better, but that it is a tried and trusty weapon, that has done its work right well in the past, and that will repay the trouble of keeping it fit for use for the future; that the more the country employs it and trusts it, the higher its military spirit will rise, and the more able, as well as willing, it will prove itself to give a firm and solid support to our first Army of the line.

Colonel Lord WAGENEX, A.D.C. to the Queen, Commanding Suffolk Artillery Militia: We have all followed with very great pleasure the lucid statements of the Lecturer on the growth of the Militia system from its original incoherent form to the position it has at present secured in association with the Regiments of the Line. I have the honour of being a very old Commanding Officer, having belonged to one of the very first instituted Artillery corps of that body; and the state of confusion, or perhaps I should rather say, of over-care, in which the Militia system was then, was, as our American cousins express it a "caution." We existed under the rule of several separate Departments, the Home Secretary, the Lord Lieutenant, the Board of Ordnance, and various others. I remember on some occasions we had as many as eight or nine different Departments to which we had to apply for stores, for pay, for accoutrements, hospital tendance and the rest, so that in fact there was no uniformity of discipline, and no identity of service amongst the various corps. True it was that there were the relics of grand old Peninsular corps. I had the honour of being placed on the Commission which re-organized the Militia service, and determined the precedence of corps at Aldershot in the second year of our recall to public service, and to all the regiments there present, some 130, there retained a glorious memory. We have now reached that culmination of our system, which has associated our recruits, and our permanent staff of the Infantry service, with the brigade dépôt system. A further step was the addition of Artillery to the Militia. It is an arm that has found great favour amongst our recruitable population; they take to the work very well. I wish also to thank the gallant Officer for the remarks he has made with reference to mobilising the Militia Artillery. I think the Militia Artillery might be mobilised for working guns in position, the object for which they are supposed to be specially designed, as except on occasions of volunteering for messing in brigades, the Militia Artillery would not quit the kingdom. I take it that in a war of defence the unit of formation and pivot of movement would be the 40-pounder battery. At the manœuvres at Salisbury, I pointed out to His Royal Highness the Commander-in-Chief the ease with which 40-pounder batteries might be worked, but the suggestion was not carried out. It would be a great mistake to suppose that the gunners of the Militia Artillery are not desirous of taking their share with their countrymen of the same arm, whenever opportunity occurs. It would have been practically

¹ The guerillas of Morillo were in the line of battle at Vittoria.

possible to have carried volunteer Artillery battalions to the front at Sebastopol; the means of doing so were provided, but their services were not accepted, and I remember perfectly well a very distinguished Brigade-Major, the late Major Bingham, R.A., who had the honour and responsibility of sending forward the Royal Artillery to Sebastopol, expressed his regret that their services were declined. We were run at that time very close indeed for gunners, the unfortunate young soldiers who were sent to the Crimea perished, as we know, more by disease than by fire; and this is a point that must always be borne in mind, that the Militia Army is the veteran Army of England, and the rank and file are men taken to a very great extent from agricultural occupations, and are capable of hard and exhausting work, without injury to their constitutions, whereas a very large proportion of the rank and file of the Regular Services comes from the towns, and it requires a long time to break such men into the hard life which the rural recruit meets at once as a daily habit of his previous life. Then they pass the first four or five years of their working life in acquiring habits of service, and come with their full strength unbroken to any work to which we may put them. I am glad to see that the interchange of Officers as between the old Officers of the Line and the young Officers of the Militia, is proceeding so successfully, the old Officers not disclaiming to occupy their place in our ranks, and our young Officers glad to have the opportunity of becoming strictly professional soldiers. All this is exceedingly advantageous, and I cannot but think that a further development is all that is required.

I quite sympathise with what the gallant Officer said about the Glengarry caps, but a soldier should be a soldier at all points, when he is once under arms, and the helmet is the soldier's head-dress, and should always be part of his equipment. It is very true helmets are not so convenient in camp, but I think whatever the soldier's equipment may be, he should acquire the habit of making the best of it, and the more the soldier has his equipments always ready, and a portion of himself, the fonder will he be of his profession. The general system seems to me to work exceedingly well in the way in which it has been adopted, and has met with a prompt and friendly reception on the part of the chiefs of the Regular Army. To them again we are very much indebted for the encouragement that has been given, and for the friendly and kindly criticism which has taught us, where we have a great deal to learn, though I am sure that our men do all that they can, within the short time that is given, to acquire the knowledge suitable for their branch of the service respectively, Infantry, Artillery, or Engineers.

Lieutenant-Colonel EVELYN, Commanding 1st Royal Surrey Militia: Although I should be the last to deny the advantage that has arisen to the Militia by contact in some degree with the Line, particularly with regard to taking part in brigade drill, I think there is now a danger of two distinct branches of the service being too much assimilated, in fact of the less being swallowed up by the greater. When I first belonged to the Militia, it had, as our gallant Lecturer remarked, somewhat of a parochial character; it belonged to the counties; it was administered by the Lord Lieutenant, the Militia Commandants had almost despotic power in their regiments, and the Officers were looked up to by the men of their companies as their real heads. The Adjutant belonged to the regiment instead of belonging to a regiment of another branch of the service, and the men looked to their own Officers, and not to men of another branch of the service as their leaders. All this has now been changed, either for better or worse; a very large step in the latter direction, and a step that has in great part to be retraced, took place a few years ago, when the Brigade Depôts were established all over the country, and the Militia regiments were marched from their old homes, where they had generally good accommodation provided by the counties, into the Brigade Depôts. Instead of having an Adjutant belonging to the regiment, they had an Officer from the Line, and an attempt was made to do away with the Militia Staff altogether, on the ground that the Staff of the Brigade Depôts would be sufficient to instruct them. No quarters were provided for Militia Sergeants, and Quarter-masters were done away with. The result was, the Militia stores got into such a terrible state of disorder and confusion, that I believe in some regiments actually there was no knowing how long a garment had done its work, whether it ought to serve one or two trainings more, or ought to have been sent away long ago. This

did not answer, and they gave us back our Quartermasters, but they said we did not want orderly room clerks, or Paymaster's clerks, and these officials were actually struck off the establishment of Militia Regiments. In fact everything was taken away from the Militia which is supposed to be necessary for the organization of a battalion, and really it seems as if it was intended to tack on each Militia Regiment to the tail of a regular regiment, to withdraw the Militia men, as far as possible, from the control of their own Officers, and to induce them to join the line as quickly as possible. That has to some extent changed, and the abolished Staff Sergeants have been restored, but still it is a matter of moment whether the present system works well, and whether Commanding Officers of a Brigade Depot and of a Militia Regiment do not sometimes find each other rather like the fifth wheel of a coach, and that either would do better without the other. Napoleon had a trite saying to prove the great objection to a divided command—that one middling General was better than two good ones, and certainly I believe one Officer of ordinary capacity would command a regiment better than two Officers, however great their talent might be. The Adjutant comes for a few years. It is not an object of ambition to the Captain of a regular regiment to become an Adjutant of the Militia. The senior Captains can hardly accept the service because they expect promotion: and the best of the Captains probably do not like to leave their own companies. It is generally some gentleman who wishes to marry, or shirk foreign service, who condescends to accept the Adjutancy of a Militia Regiment. He is not likely to have his heart in the cause; he is not likely to be constantly on parade, to lead a barrack-square life as our Adjutants used to do. I think, therefore, though we are very much improved by working with the Line, we should not be improved by the Line taking the command of their regiments out of the hands of the Militia Commandants. The Commandants of Militia Regiments have been deprived of all the functions they once possessed. They are literally on the same footing as other Officers of the Militia, that is to say, they come up for training, go away at the end, and become private individuals during the non-training period. I have myself been told by an Officer commanding a district, that a Commandant of Militia could not even be written to officially in the non-training period. I knew he was wrong, because I, as Commandant, receive official communications almost every week, but the wish was father to the thought, and that is, I believe, what a great many people would like to lead the Militia to. The Home Army should be kept quite distinct from the Foreign Service Army, and the Militia should be a Home Army fit for active service, in time of war, but not liable to Colonial or Indian service in time of peace.

Colonel J. H. DUNNE, Commanding 28th Sub-district: I had no intention of speaking, but having heard so much from the last speaker about these abused brigade depôts, I may perhaps, having commanded a Line regiment for thirteen years, and one of these brigade depôts for three more, be allowed to make a few remarks. In the sub-district that I command there are two Militia regiments, and certainly the staff remains intact, exactly as it did in the olden time. I cannot imagine in what sub-district Colonel Evelyn can have served, where things have been carried on in the way he has mentioned.

Colonel EVELYN: What I said was that these were all taken away from us, but they were given back again; it was an attempt that happily failed. The only difference between the old and the present staff is that now there is no hospital sergeant.

Colonel DUNNE: Then I must have misunderstood Colonel Evelyn. I will now make one or two remarks upon Colonel Walker's lecture: With regard to the non-commissioned officers of the Militia, Colonel Walker said that a bounty of £1 or 10s. would introduce a better class of Militia non-commissioned officers. I don't allude to the permanent staff. I do not think so. In my opinion you will never get really smart, good non-commissioned officers unless you can get men who have served in the Line. If you can induce men who have been non-commissioned officers in the Line, when sent to the Reserve at the expiration of their first period of service, to go to the Militia, and allow them to count say two years in the Militia as one in the Line, towards the prospect of an ultimate pension, you may then get a type of non-commissioned officers in Militia regiments which may be of some use. With due deference to exceptional Militia regiments, I have hardly ever seen the

non-commissioned officers who merely come up for training who are equal to the work. No twenty-eight days will do it; ten times twenty-eight days will not make a man a good corporal or a good sergeant, and you cannot, as a rule, get good Militia non-commissioned officers, unless you hold out some permanent reward. No doubt it is far preferable, if you can do so, to put your regiment into a camp or an enclosed place. I command a sub-district of Warwickshire. The racecourse close to Warwick belongs to the small inhabitants of the town; the cottars have a claim on it, and they will not allow this place to be used by the Militia unless the Militia are billeted in the town. The barracks at the place where I am were made too small for a regiment of Militia to be encamped and to drill there. That is the case with half the brigade dépôt barracks; they are not large enough. At Devizes, on the contrary, the regiment is marched into barracks, encamped there, and does all its drill, being entirely worked as if it were a regiment of the Line, and the discipline is as good as in any Line battalion. Unfortunately, however, half of the brigade dépôt barracks, as I say, have not been built large enough, and if they had only taken in three or four more acres, it would have been a vast improvement. Colonel Walker said brigade dépôt Colonels ought to encourage young Militia Officers by making them gallopers, but we have no place to gallop them in, and I know it is so with many other brigade dépôts. I have two Militia regiments under me in my sub-district, and there is not the slightest friction in any way between the Colonels and myself. They write private notes to me on any subject in which I can be of any use to them or they to me, and I have never found the slightest difficulty between us. But I do find that Colonels in the Militia feel very much their removal from old county quarters, and being in some cases ordered into brigade dépôt barracks. In those barracks there is very often no room for the whole of the permanent staff. The outside number of rooms allotted for one Militia regiment in brigade dépôt barracks is usually eight or ten quarters for non-commissioned officers. Now there are a good many more than that on the permanent staff, and in Warwickshire one of the regiments has had to give up its barracks at Leamington, and a portion of the permanent staff is put into the brigade dépôt barracks, the remainder being obliged to live a mile and a half off. If the brigade dépôt system is going to be continued, there must be added to the barracks a sufficient number of quarters for the permanent staff of the Militia belonging to that dépôt, and the arrangements for stores and for issuing clothing to the men when called out must be improved, and until that is done there must be a certain amount of friction, for naturally Colonels of Militia regiments must feel very much annoyed to find one half of the staff a mile or two miles away from the other half. As regards helmets, as long as men are living in pokey lodgings, I do think that the Glengarry is preferable, for the helmets would be knocked and kicked about and spoilt. I think with very little trouble and expense, the Militia and brigades in sub-districts might work well together, but until these things are attended to, I do not think it is possible for everything to run quite smooth.

Lieutenant-Colonel Lord GALLOWAY, Commanding Royal Ayr and Wigtown Militia: I do not propose to discuss the brigade dépôts. I believe I have spoken as much on the subject of brigade dépôts as most people, and I am afraid if I begin with that subject I should infringe upon the wholesome rule, and perhaps the discussion might be looked upon as somewhat polemic. As I entered the Militia service in 1854, and re-entered it again after 15 years' service in the army, serving in the sister regiment of the brigade which my gallant friend Colonel Walker commands, I wish to make one or two remarks. I think I may congratulate him upon the very able lecture he has given us, and I think as far as I can follow him, I may say that I agree with him upon almost every point. The only point on which, if he will forgive me for suggesting it, I do not know that I entirely agree with him, is as to the effects that might be produced upon the recruiting, if one scheme which he advocated were carried out. I believe he is aware that I do not entirely endorse his opinions on the question as to the extension of time of the preliminary drill. We all know at times it is easy to keep up the establishment of Militia regiments, but there are other times when it is not so easy, and I think my gallant friend will admit that at times he has not been able to show such a substantial regiment in numbers on parade as it was his ambition to do. My own view is, you

must be a little chary in this respect. There are times when you have rather to entice men in order to keep up the establishment of a regiment, and I rather have an idea that a man is a little frightened if he knows he is to begin service by being immediately put through three months' drill. I am, therefore, not quite such a keen advocate for the extension of preliminary drill as he is. But the particular point to which I wish to refer is this: he thinks that the geographical sphere within which a Militia regiment may be called upon to serve should be considerably extended. I cannot say that I quite adopt that view. I think the present army reserve is a mistake. I believe that the army should look for its reserve to the Militia alone. At present each Militia regiment gives its quota of some 25 per cent. to the Line, and these are the Militia reserve. Now I think if what was proposed by my gallant friend was carried out, you would do away with the Militia Reserve at once, and that is a mistake. I should like to extend the percentage in each Militia regiment as a Militia Reserve; at present, instead of being 25 per cent., I should suggest 40 per cent. Take a battalion of 1,000 men; in that case you would at any time be ready with 400 men to join any Line-battalion or Guard-battalion. I am happy to say I sent a good many of my men to the Guards only two years ago, you will have 400 men available at any time to make up any Line battalion, and would still keep a good nucleus at home upon which to form another battalion of 1,000 men, and so you keep up a continual reserve, which is a very great object. You always have something to fall back upon and are always ready to feed battalions that are wanting to be fed, in the Line. That would not prevent, in time of imminent danger, a battalion of Militia volunteering as a whole, and I am quite certain you would never call upon a Militia battalion in vain, if it was really wanted to go anywhere. It might go in entirety if it was wanted, but I think that ought to be an exception; therefore on that point, I shall venture to differ from my gallant friend.

Colonel Sir LUMLEY GRAHAM, Bart.: I wish to notice one branch of the subject which was touched upon rather lightly by the Lecturer. It is a very important branch, and I was rather surprised that none of the gentlemen who have taken part in the discussion have alluded to it. The Lecturer very truly observed that the British soldier, or indeed any soldier, was nothing without understanding the use of his rifle, an opinion which we shall be all most ready to endorse. We all know that the power of fire has developed enormously in these later days, and therefore it is all the more necessary for a soldier to be skilled in the use of his rifle. I am afraid, without wishing to pick any hole in the Militia, that is a point in which they are a good deal behindhand. Colonel Walker said there are a large number of battalions which have no Musketry Instructor, and he recommends certain measures for inducing Officers to volunteer to qualify themselves for the purpose. That, no doubt, would be very useful indeed, but, I fancy, there is another very great difficulty. In some cases Militia regiments have not got any range to practise at, and besides, the time of training is so very short that there is no time to train them in the use of the rifle. I saw a very fine Militia battalion the other day, numbering 810 men, they were working as hard as men could do, and it was wonderful to see how they improved daily. I saw two companies out at rifle instruction, and I found they did not go beyond what we call preliminary drill, they had no target practice. The report of last year's musketry instruction in the Militia states that there were 89 battalions of Militia that had no target practice out of 123, while those who had target practice had not been trained beyond 400 yards.

The CHAIRMAN: The recruits all have the preliminary musketry training; that ought to be borne in mind.

Sir LUMLEY GRAHAM: That, of course, is an important point, but still we all know that training ought to be carried on in after years as well as when the soldier first joins. With the regular soldier, unless training were carried on regularly, year by year, he would soon forget the use of his rifle, and, I think, the same will apply to the Militia. I should wish to ask the Lecturer, who is an experienced Commanding Officer of one of the best Militia regiments in the service, whether he can suggest any way in which efficient training in the use of the rifle could be given to the Militia.

Lieutenant-Colonel GARNHAM, Commanding 2nd Battalion, 6th West York Militia:

I must express my extreme pleasure at having heard a lecture in which I can fully concur, and I was aware, from having seen Colonel Walker's Regiment at Cannock Chase, that as a Commanding Officer no one could surpass him. It appears to me however that there are many details into which we have to go with respect to what is really wanting in order to put a polish on the Militia. An enormous deal has been done, and I most cordially approve of the increased connection between the Militia and the Regular Service. With regard to brigade dépôts, the dépôt to which my regiment is attached, at Halifax, happens to have had an unusual number of Officers attached to it as Brigadiers, and one and all of them have shown the greatest possible tact, temper, and consideration in all their communications with the Militia. I do not find any sort of friction, and I think if anybody has profited by the establishment of the brigade dépôts, it certainly is the Militia Force, and I do trust that the connection between them will be considerably increased as time goes on. I think, with respect to the increase of training, it would be a most excellent thing if we could get a week or a fortnight occasionally for the purpose of instruction in brigade drill. Gentlemen will be glad to hear that a certain number of regiments have been specially told off this year for musketry instruction and nothing else. My regiment is one of those selected, and I trust that if sent into barracks at Fleetwood, as we hope to be, we shall be able to make a good figure of merit. It is perfectly absurd that regiments should go on year after year learning certain movements without having the opportunity of learning the practical use of their arms. One great thing we have to look at is to see that our ranks are full. I have here a *précis* of the Report of the Militia Committee of 1876, and it will be exceedingly useful to work on the lines of that Committee as much as possible. Unfortunately four years have elapsed and very little has been done on that Report. There is an allusion contained in it which I do not quite understand; it says:—"It is not necessary to keep up the full strength of men in time of peace, as experience shows that men are easily obtainable in case of emergency, and it is probable that an alteration in the militia laws may afford means for the completion of the militia in time of danger should the voluntary enlistment prove insufficient." Therefore it appears there is some change contemplated which may have the effect of rendering it easier to keep up our strength. There is also a suggestion that the Army Reserve men who have completed army or army and reserve service should be deemed re-enrolled if they entered the Militia. That is a very good suggestion and could be carried out. The Report states that from £8,000 to £10,000 per annum is lost by the men who take the ten shillings enlistment fee, and never turn up for training. This is a point on which I think legislative interference is absolutely necessary. Last year I sent in a report, through the General Commanding our district, on the subject, and I do hope that Militia Colonels will follow the excellent example set by Colonel Walker, of showing a personal interest in these matters. It is only through us that these things can be kept before the Government. There is no lack of will on the part of the military authorities to do everything in their power for the Militia; the only difficulty is to get the money, and it is only by their receiving reports from Colonels of regiments that we can hope to get matters into a proper form. I would suggest that some notice should be given to employers whenever a man has enlisted in the Militia, and after receiving that notice the employer should be bound to give notice to the Adjutant if that man leaves his employ, or leaves the district. The Committee suggest that extra punishment should be given. I think also that the police should be assured the sum of £1 for the arrest of deserters, and that we want extra sergeants to form a recruiting police, and if we could adopt any sort of marking the men, tattooing them, it would be a very good thing.¹ It is only by the repeated action of Commanding Officers bringing these points before the authorities, that we can hope that they will be improved. My regiment, in 1877 to 1878, tried the Committee's suggestion of training men on enrolment, but we found that it did

¹ I also think it would work well to entitle every trained Militia soldier to a military funeral, and if bearing any tattoo or vaccination mark there would be no danger of imposition, while the bearing such a mark would come to be regarded as a privilege.

not answer. Between October, 1877, and June, 1878, we recruited and trained 555 men, of whom, at the following training, in 1879, we had only 215 present. Of the total recruited, 123 went to the Army, which number is above what we should probably have supplied otherwise; but we lost 217 men altogether. The great difficulty we have in dealing with all these questions is the different conditions of Militia service in different parts of England. I am quite aware that the regiment commanded by Colonel Walker, in Scotland, is in a totally different position, in many respects, to my own battalion, which is raised in a manufacturing district, because the very want of work which will send a number of recruits to me, will very likely make land produce go up; and there will be no sort of distress in a county district, when in a manufacturing district you can get recruits very easily. I think the great rule is to get the Militia placed on a broad military basis, and then all these things will settle themselves very much better than they will by an attempt to return to the old limited county system. I remember the late General Sir James Lindsay saying to me only about one year before we got out of the hands of the Lord-Lieutenants, that such a result was too much to hope for, and yet, within that time, that object was achieved, and I hope we shall continue to go on improving. Now we come to another matter. I am myself one of the most determined opponents of billets. I think it is simply unfair to put these men into billets and then to punish them as soldiers. I am happy to say that the Militia as a rule are now moved out of billets, but I do not think sufficient has been done in order to insure the comfort of the men in camp. They ought, for instance, to have covered cooking and cleaning places, etc., and the men want dry flooring. My camp last year had to be strack simply owing to the spongy nature of the soil, capillary attraction bringing the water right up into the centre of the men's tents. I cordially approve of the suggestion that flannel shirts should be provided for the men, and I think as regards dress, the Commander-in-Chief was perfectly right in advocating that our men should wear helmets, because, although it is true we are not often brigaded with the Line, still Volunteers have their helmets, and we are brigaded with them constantly, and certainly our men lose by not wearing the helmet. I hope, therefore, that the dress question will not be considered as finally settled on that point. As regards non-commissioned officers, it is evident that will be the weak point of the Militia until we get an alteration. One recommendation of the Committee was that the Sergeants should receive 1s. 8d. a-day, provided that they were efficient, showing that the Committee were fully alive to the necessity for improvement. There is one arrangement with respect to the brigade depôts and non-commissioned officers which is objectionable, and that is, that the Colonels have not sufficient option about the appointment of the permanent staff. You have first to see if you can get a non-commissioned officer from any of the affiliated Line regiments, and, if not, if you can get them in the district, and perhaps by that time you have lost the chance of getting a good non-commissioned officer. The other day I had to appoint a Paymaster-Sergeant. I knew that I had nothing to do but to go to Portsmouth, where I could have got an excellent man, but by the time all this routine was gone through I had lost my chance. We now pass to the Officers, and I do think something is required in order to keep down their expenses. The allowances to a Field Officer are utterly insufficient as regards forage, carriage of charger, &c.; it is notorious that regiments in the North of England cannot be officered by local Officers, and the travelling allowances are notoriously insufficient, in Lancashire and Yorkshire for instance; and as regards myself, I reside in Sussex, and have to take my horse to Yorkshire. Many very eligible men also can only obtain chargers at considerable expense, even those who, like myself, keep horses, not always having those which they can use on parade.¹ There are numbers of men with Army service, who would be very happy to come to us and would make most valuable Officers, who simply say: "We cannot afford it." Whilst the Militia was officered by country gentlemen only, this difficulty did not exist. I am quite sure that a little money would insure an ample supply of Officers. I also think that more should be done in the way of keeping up the *esprit*

¹ Arrangements might be made to provide chargers at a reasonable rate, and at all Militia head-quarters forage should be supplied at the Government rate as well as stabling.

de corps of the Militia. I met an Officer of Colonel Walker's regiment coming from a recent levée and I was delighted to hear that the Officers of his regiment had been to Court in a body.¹ All these little things tell, and the more we keep up the service the better for the service. There are other inducements which might be given: let Militia Officers, after a certain time of service, be deemed qualified for appointment as magistrates. These matters have all been brought before the Government and many of them approved of, but it requires pressure to arrive at results, and it is meetings of this sort which are so valuable in applying that pressure. I want to say one word for the Adjutants. Without wishing to throw any sort of slur upon the Adjutants under the old system, I think that, as a rule, at the end of five years, the old Adjutants of Militia got very rusty, and while it is difficult for an Adjutant of the Militia, coming from the Line, fully to seize at once all points of the Militia service, I think the having them is an advantage to us. I am one of those who think that any Officer coming from the Line into the Militia has a great deal to learn. I am sure that while we need to learn a great deal from the Line we can teach them a great deal which concerns our own service, but notwithstanding that I cordially agree with the system which gives us young and active men from the Line, and as far as I have seen of them, not only in my own regiment but in others, they have given good service and have worked honestly and well. I could not, therefore, allow any unfavourable comment to be made upon them without saying these few words in their defence, according to my own experience, which has not been limited to my own regiment, but has been rather extensive.

General Sir JAMES E. ALEXANDER, C.B.: I should like to make two or three remarks in connection with what Colonel Graham has said about the Officers as to the matter of expense. I have seen a good deal of Militia regiments, and I have had two sons in Militia regiments. As to the matter of expenses at messes, I think it most important that Commanding Officers should be very careful in regulating the expenses of the messes in order to make the service popular, because it unfortunately happens that in *some* regiments there is a great deal of heavy expense incurred, which seems to me, as an old Officer, to be quite uncalled for. There is a lavish expenditure in champagne, for instance, and entertainments of all sorts, so that the pay of the Militia Officer is usually quite inadequate to his expenses. I think the Commanding Officer should consider what will be the habits eventually of young Officers if they are allowed to indulge too freely, and besides, their example has a bad effect upon the men of the regiment. I therefore respectfully suggest that Commanding Officers should be exceedingly careful in keeping down expenses during the short training of the regiments. It will be for the advantage of the service in my humble opinion if a system of *simplicity of living* is inculcated.

Lieutenant-Colonel GARNHAM: The expenses to which I alluded were not those under the control of the Commanding Officer, but the expenses arising from insufficient allowances, which he cannot prevent. A heavy expense, for instance, has been thrown upon many regiments, by having to provide their kit, because they no longer mess at hotels, and we have had to supply a kit costing some hundreds, and have been told by the War Office that there was no fund for that purpose.²

Colonel ALEXANDER MONCRIEFF, C.B., Commanding Edinburgh Artillery Militia: Before referring to one particular point connected with Artillery, I desire to express my admiration for Colonel Walker's paper, which is full of special knowledge and contains many important points. I may indeed say after some experience, not a short one, of the Militia service, that I am able to endorse everything which he has

¹ On becoming a Captain in the Militia many years ago, I was informed, at the Lord Chamberlain's office, that such promotion was not deemed a sufficient change of status; and that having been presented before appointment, no further presentation was requisite, an answer which could hardly be given now to the holder of the Queen's Commission.

² There is an allowance for this purpose given to all new Line battalions, and to Militia battalions when first *embodied*, and it is evident that as regards the necessity for a mess kit, all regiments not messing at hotels are placed on the same footing as an embodied regiment, and but for a technical objection are entitled to such allowance.

put forward. One must always recollect that this force now consists of no less than 130,000 men, more or less trained; that it can be increased to 500,000, or any required number, by a stroke of the pen, and without any departure from precedent or principle; that it is a paid force available as soon as it is mobilised, and is therefore more analogous to the conscript armies of the Continent in its constitution than is either the Regular Army or Volunteers, which depend on voluntary recruits. It is most important that we should obtain the best results by managing this national force properly. There are two ways of looking at the Militia: it may be regarded simply as a convenient adjunct and recruiting engine for our peace establishment, but that is a secondary consideration; the main purpose of the Militia, I submit, is to be utilised to the greatest advantage in time of war. With regard to the latter purpose I may state that an alternative which has not been mentioned to-day is at our disposal for the Militia: the men are enlisted for six years. Now if it was understood that every Militia regiment was for one year in six liable for general service, and that every man who enlisted in the Militia was liable for that year of his service to be called upon for foreign duty without notice, this would give the Government, on an emergency, the control of more than 20,000 men in addition to the Regular Army, and it would no doubt in that case be considered advisable to give those Militia regiments on the rota for that particular year a special extra training, to make them quite ready for any sudden demand for service. In all cases where the Militia are used, I am convinced that the best results are to be obtained by keeping the men and Officers together in mutual reliance. Colonel Walker's remarks on this subject are pregnant with meaning to those who understand them. It seems to be the general idea of these Regular officers who discuss this question from the ordinary-service point of view that the greatest use of the Militia is to supply in time of need recruits to the Regular Army. This view is tenable in peace time, or for little wars. In the event, however, of a great European struggle when we require to put forth our whole strength, the Regular Army is so small, and so inexpansive, that we must use the Militia, or else be deprived of troops. In modern warfare, a decisive blow might be required before the dribbles of recruits drawn from the Militia were properly assimilated. The Militia, in the event of such a war, would be largely increased in numbers, and it would then be desirable to use existing battalions as they stand with their own Officers. The rapidity of modern war operations, and their extended scale, exclude other alternatives. That being so, I question the policy of a system which, previous to employing Militia regiments in the field, takes away their best blood from them for the Regular Army; but I venture to say that if no such measures are taken to weaken the tie between Officers and men, when they are asked in time of war to serve abroad as battalions, there will be no hanging back.

In reference to the point I rose to speak on, Colonel Walker mentioned that this service, which has a very ample proportion of artillery regiments, has no part of the force capable of representing field artillery, which is absolutely necessary to complete the brigades or divisions of which the Militia form a component part. He suggested that something not altogether in the form of field artillery, but artillery consisting of heavy guns of position with a certain amount of mobility, might be obtained. In that remark I entirely concur. I believe, moreover, that we have all the elements ready to hand for supplying our divisions with batteries of say 40-pounders, or even lighter, but still powerful guns of position; and we have in the farms existing in every district, the horses and the drivers that we want to take these guns either to a distance or into action, but we have no organization for obtaining them on an emergency, nor a training for making them effective. In alluding to the service of such guns in connection with a field force at home, it should not be forgotten that the same class of horse, the same kind of artillery valuable for defensive operations in a country with good roads, is that which is required for our siege trains for offensive operations. One could scarcely imagine better horses for this purpose than the ordinary plough horses used in England and Scotland. I hope in the interest of the service that all the suggestions which have fallen from Colonel Walker in his valuable paper may receive the consideration they deserve.

Captain COCKBURN, late 42nd Highlanders: I have listened most carefully to this

lecture to find a single thing to criticise, but I have failed in the attempt; unless it is to find fault with what was said as to the Glengarry bonnet, for I was perhaps one of the means of getting it introduced into the service; and I believe it to be the best head-dress for military and sporting work of all kinds. Even in hot climates it can be used with a turban, as I have often used it myself in India, and does not get in the way of one's eyes in shooting, as the helmet does. I well remember when the helmet was first issued to the 42nd, in 1858, in India, the men would not keep them on when marching at ease, but carried them on the tops of their muskets. I could not help, therefore, saying a few words for the Glengarry bonnet.

It has long been a hobby of mine that the Militia should be the asylum as well as the nursery of the Army, both for Officers and men, and I think the system that was adopted during the Crimea, of giving Militia Officers commissions in the Line for every hundred or so many men who enlisted from each Militia regiment, was a very good one, for I have known Officers induce the best men in their Militia regiment to go with them to some Line regiment they wished to join; and I would not only make the Militia the nursery, but also the asylum for the Regular Army, to which, when the absurd system of short service is done away with, Officers and men who wish to marry might retire, for I would prohibit marriage in the active branches of the service, but let an Officer or man when he wants to marry, after say 13 years' service, retire from the Line battalion to its linked Militia regiment, and I hope the day will come when the Militia regiment will be made the asylum to which the old soldier can retire, for I believe that the localising of corps and the linking of Militia regiments to their natural or county Line regiments is one of the best things which has been done for the Army of late years; and when Officers and men can pass easily from their linked Militia regiments, backwards and forwards, it will be a very great thing, not only for the Militia, but also for the Army.

To do away with fraudulent enlistment in the Army and Militia, I would adopt Sir James Alexander's plan of marking every Officer and man on his becoming a soldier of Her Most Gracious Majesty, with a crown on his breast, and I would have this done as a sort of religious ceremony, only a little less solemn than that of baptism, which would, I believe, have a very salutary effect on the good recruit, and would deter none but bad men, who are not worth having, from enlisting; at the same time it would save the country large sums annually, and do away with the mock mercy-monger's howl against the cruelty of branding their dear deserters with the letter D, the only objection I can see to which is the difficulty of catching them.

Major-General A. CUNNINGHAM ROBERTSON, C.B.: Sir Lumley Graham having referred to what is no doubt the weak point of Militia training, their musketry instruction, perhaps it may be worth while to reproduce a suggestion made by Lieutenant-Colonel J. Millar Bannatyne, with whom I formerly served in the King's Regiment.¹

Inducements for militiamen voluntarily to form squads for rifle practice under the superintendence of the permanent staff every Saturday afternoon during the summer might be a small premium to each man who made a certain number of points, and a few prizes at the end of the season, open to all who had fired a certain number of rounds, and scored a certain percentage of points to the number of rounds fired. I do not mention that suggestion as sufficient of itself to meet the difficulty of devoting sufficient time to the musketry instruction of the Militia to teach every soldier of the force how to use his rifle with effect. Many corps are so constituted that it would be impossible to carry the suggestion out, and in many localities ranges could not be found within a convenient distance of the quarters of the permanent staff, and of the homes of men belonging to the Corps. Even under the

¹ Vide "Our Military Forces and Reserves," by Major John Millar Bannatyne (published by Mitchell, London, 1867). There is a copy of this pamphlet in the library of the Institution. The suggestion referred to will be found at p. 22. Speaking of the training of militiamen, Major Bannatyne says:—"It is most convenient for rural labourers to take their training at a suitable season of the year and have done with it; but with the artisans in towns it is different. . . . The training of such men must be so managed as to occupy hours of leisure only."

most favourable circumstances, where the homes of the great majority of the soldiers were concentrated in a district adjacent to the head-quarter barracks, and where a good range was available and easy of access, it could not be expected that it would be possible to induce a large percentage of the men to attend voluntary practice. It is therefore obvious that the suggestion is in its nature supplementary. If the elementary training of a corps was defective, to adopt it, would not tend to remedy this defect, but if a complete course of musketry instruction and practice formed an indispensable part of the preliminary training of every Militia recruit, then I think the adoption of Colonel Bannatyne's suggestion, in cases where the constitution of the corps was favourable, would be an excellent means of increasing proficiency, and enable a fair percentage of the men of such corps to become skilful marksmen.

As regards the preliminary training of the Militia recruit, it should be so arranged that whatever else was defective, his musketry instruction should be thorough and complete. From the nature of the process, musketry instruction can only be carried on at certain seasons and in special localities, and only small squads can be trained at a time. It is therefore a slow process, and cannot be applied simultaneously to large masses of men. If on some sudden emergency, the Militia of the kingdom were embodied for service, and if the musketry training of the men composing the force were defective, the defect would be irreparable.

On the other hand, calling out simultaneously a number of defectively drilled regiments, and massing them in camp, so far from impeding would rather tend to facilitate the additional training required to remedy such defects as unsteadiness, looseness of movement, or want of familiarity with the prescribed methods of effecting changes in the order of formation or in the position of battalions and brigades.

As regards drill and field exercises, Officers, such as Colonel Walker, somehow or other under the present conditions of Militia Service, manage to obtain results which are really marvellous.

Many Officers in this room have I dare say had opportunities of seeing Militia regiments inspected at the conclusion of their 28 days' training, and have felt considerable surprise at the degree of efficiency obtained in so short a space of time. But has any Officer present seen a regiment parade on the first day of the training? If not, will he believe what I have to report concerning a parade of the Scottish Borderers on the 1st day of its last year's training which I had the good fortune to witness? I saw men, who in the morning had arrived in their working dresses from distant homes in country districts standing perfectly steady in the ranks, well set up, with their hair neatly cut, and with clean shaven chins, without a stain on their white belts, without a speck of dust on their well brushed and well fitting scarlet tunics, when they marched past, and did various manoeuvres with the utmost steadiness and precision, and without a mistake.

May I be permitted before I sit down to express to Colonel Walker the great interest with which I have listened to his very able lecture?

The CHAIRMAN: The interesting lecture which we have heard from Colonel Walker deserves our very cordial thanks, and I am sure Colonel Walker must have been gratified by the many expressions of cordiality and agreement which have fallen from gentlemen well acquainted with the service. Colonel Walker speaks with very great authority upon this subject; he has served nearly 30 years in the Militia, always occupying an important position in the service: he speaks with the authority of a man who has a practical acquaintance and knowledge of the Force. There is a homely saying that nobody knows better where the shoe pinches than he who wears it. Colonel Walker has been able to show us in the course of his lecture where shortcomings exist and where we may reasonably hope amendment may be made. Nobody can fail to see that if this country is ever engaged in a serious Continental war the Militia will have to bear a considerable portion of the burden of maintaining that war. If anybody has any doubt upon this subject, let him call to mind what took place only a short time ago, both at home and abroad, during the South African Campaign, when we had to contend against a savage people only armed with spears, and when it was found necessary to send out a great force of regular soldiers amounting to about 20,000 men; therefore, if it ever is our

misfortune to be engaged in a European war it is quite clear we shall have to look for assistance beyond the soldiers of the regular forces and call on the Militia: and we shall expect to call upon those who are well able to take their place in line with regiments of regulars; I believe we shall call upon troops who are more than able to hold their own against any foreign Continental armies which may be put into the field. That is my opinion, and that is the opinion of many distinguished soldiers who have had opportunities of seeing what the Militia is. We have received to-day many important and useful suggestions by which the force may be improved. If I may be allowed to make one or two observations with regard to those suggestions I will do so. Having for some time been engaged as Financial Officer at the War Office, I naturally look upon any schemes of improvement which may be brought to the notice of the authorities with a financial eye, and I separate them when possible into two classes; one class containing improvements which may be carried out within the cost which is already provided, and another class containing those improvements which will entail further and additional expenditure of money. Now if I may be allowed to make a comment on Colonel Walker's lecture, it will be this, that out of many excellent suggestions which he has made, some must be classed amongst those which would entail further expenditure on the country; and although I admit readily and cordially that what he has proposed would be beneficial, yet examining his proposals practically, I am afraid some of them would cost more money than the House of Commons, liberal although it be, would be willing to disburse. I turn with more hopefulness to those suggestions which may be carried out without further expenditure of money. There are some to which Colonel Walker has alluded; there was one which was mentioned by Colonel Garnham which struck me as one to which Militia Officers should turn their attention, as it would not entail any additional expenditure but rather bring about an economy, and proposals which suggest and bring about economy should be regarded by military men with more favour than they are regarded. Colonel Garnham alluded to the annual loss which is caused (a loss amounting to £8,000 or £10,000 a year), by the ten shillings enrolment money given to Militiamen who receive that portion of the bounty but who never afterwards appear at drill. Here is a case where Militia Colonels and Adjutants may, with zeal and with due attention, do a great deal to bring about a better state of things. Adjutants should inquire most carefully into the antecedents of men who profess to wish to serve in the Militia, and they should ascertain whether the men are likely, after they have received the enrolment money, to put in an appearance and go through the preliminary drill and the annual trainings. I think if more attention was given to this by Adjutants and if Militia Colonels superintended somewhat more this enlistment, great benefit to the service would be done.

It seems to me also when a man is taken into the Militia, and has received his enrolment money, he should at once, if possible, be put to do his eight weeks' recruit drill. When you have got your hand upon the man, keep him and drill him, and the chances are he will come up again for his first and subsequent trainings; if he does not turn up again for his first training, you will, at all events, have got something for your money. There is good reason to think that want of information and ignorance in the recruit, as to when, and where, to come for his training, is frequently the cause of his becoming an absentee.

Colonel Dunne adverted to the non-commissioned officers of Militia, the non-commissioned officers as distinguished from the permanent staff, and he said in his experience he found that they were of less value than they might be. At all events, he spoke of them as being men whose usefulness might be greatly improved. Now I believe that within the last few years a great advance has been made in the efficiency of some of these non-commissioned officers, by sending them to schools of instruction and giving them a certain amount of training, in the same way that Officers receive training; and those who have had the advantage of that training, I am told, are most useful to their Commanding Officers. If these non-commissioned officers could always be called up, and be employed in assisting the permanent staff during the eight weeks' preliminary training, a substantial advantage would be gained, and the extra cost of their pay would be well bestowed. Soldiers who have served their six years in the Army are, I suppose, able to go into the Militia, and if they

take the stripes, they would be, I have no doubt, of very great assistance to the force. Colonel Walker speaks with authority when he recommends that recruit training should be extended from eight to twelve weeks, and I thoroughly agree with him in that proposition. I believe the first training a young soldier receives is a training he never forgets, and if he becomes thoroughly habituated to the use of arms, and is put through his musketry training carefully, during his first recruit drill, he may be safely considered to have acquired the habits of discipline of a soldier, and he will never forget it afterwards. The drill of recruits may now, under statute, be extended to six months. Pay, however, is only provided for two months, in addition to the twenty-seven days' training. A little more leniency might possibly, I think, be exercised in allowing certain Militiamen who have done their recruit drill, and perhaps one training, to remain at their homes instead of coming up to attend the annual training. There would be a certain amount of economy in it, little or no loss of efficiency, and it would be popular with employers. You might save the bounty, although I would not say that it would be absolutely wise to do so; perhaps it would be fair to allow the man to have his bounty, although he remained at his home. More good men would join the Militia, if they felt that on an emergency, and on an appeal to the Commanding Officer, they might be allowed to stay at their homes instead of coming up for the twenty-eight days' training. The State would be relieved from the charge for rations, and from the twenty-eight days' pay for the absent men, and I do not think the service would suffer, because the selected men would not have time to forget their first training. I think masters would be more disposed to encourage men to enlist in the Militia, if they felt that on an emergency they might obtain leave for them to stay away. Nobody can feel more strongly than I do the necessity of the Militia going through musketry practice; it is most important that every soldier should be taught to shoot, and I am very glad to remind you that this year a certain number of Militia regiments are to have their time specially devoted to shooting during training.

Colonel WALKER: I beg to thank you very heartily for the more than friendly reception with which you have honoured me, and especially I beg to say how proud I am at seeing the chair occupied on this occasion by one who not only has held a very important post in the administration of our Army, but who bears on his breast the proudest badge the British soldier can wear. The points which have been touched upon are so very numerous that I fear I shall hardly be able to overtake them in detail. With reference to the subject of non-commissioned officers, I hope I need not say that if I saw the slightest prospect of the War Office supplying us with non-commissioned officers who had been previously trained in the Line, I should accept them with more than gratitude, but I know I have no such hope, and therefore I must make the best of the materials I have at my command. I can only repeat that I have found I can, by careful selection and training, secure a very fair amount of efficiency; for ordinary regimental duties they acquit themselves fairly well, and I feel quite sure in a very few weeks those men would make fair non-commissioned officers.

I touched lightly upon brigade depôts because I have the fortune (shall I say good or bad?) to be detached from a brigade dépôt centre. I have the privilege of being inspected by a very zealous and efficient Officer; but certainly as to the bright hopes that were held out to us as to being able to receive assistance with regard to instructors we are entirely disappointed. I select my staff exactly as I did under the old system, by advertisement, and as I say with the single exception of seeing the Officer commanding the brigade dépôt at inspections, the brigade dépôt and I have nothing to do with each other.

Lord Galloway holds, and very fairly, that it should be as important or more important to maintain the numbers of the Militia as to maintain its efficiency. Of course Lord Galloway would be glad to have his strong battalion, and also to have them trained for the full amount of preliminary drill. It is a question of alternative, I should prefer of course always to have the command of the recruiting market, and to keep up my regiment to the full strength. As I say, it is a question of alternative, and if the alternative is put before me, whether I would rather have a larger *certain* number of comparatively inefficient men in my companies, or have the whole of my men comparatively thoroughly trained, I should not hesitate for one moment to

adopt the latter, and for this reason—if you have your regimental machine in good working order and your men thoroughly grounded in their work, then you can increase the mere numerical strength rapidly to almost any desired quantity by an increase of bounty; but if your regiment is composed of untrained men, it will take months, if not years, to make them into a real working regiment. I had the misfortune to differ from Lord Galloway also on the subject of the employment of the Militia for foreign service. As I understood him, his plan was rather to increase than diminish the Militia Reserve, so that each regiment might hold 400 men, ready to be passed into the Line. If the Militia Reserve is necessary it is a necessary evil. I remember when it was first established by General Peel discussing the subject with him; he admitted that it was an evil, but he said, "We must have the men, the Militia is quite prepared to make great sacrifices, and we accept the Reserve system as a necessary evil." It is an evil that is pretty well known in the Line, because we have seen lately a good deal of the mischief of wrecking the efficiency of one regiment in order to fill up another to a fighting strength; but a Line regiment always has a chance of recouping itself at the expense of another Line regiment, which is not the case in the Militia; with us it is all *give and no take*. Therefore I accept the Reserve system as a necessary evil, and I do not join Lord Galloway in wishing to see it extended. My belief is that although the Militia is prepared to make great sacrifices to support the Line, it is almost impossible to keep up the high spirit which ought to animate it, if Militia regiments are taught to consider themselves simply as nurseries and training schools for the Line and not as units in the fighting strength of the country. Sir Lumley Graham has referred to the subject of musketry. I should be the last man to underrate the importance of that. I am an old Musketry Instructor myself. I put a whole embodied Militia regiment of ten companies through the Army course, and it occupied the position of 14th in the Returns of 1858, in the whole Army. It is impossible at present to train the Militia as might be desired, but I will not admit that they are entirely un-instructed; they certainly are imperfectly instructed, but where the existing system is carried out fairly, men can be well grounded in the elementary use of their rifle. I have succeeded in obtaining very good practice with my own regiment up to the short distance allowed, from 200 to 400 yards; but I rejoice to know that there is a new system of training regiments for one year in musketry alone, and that, coupled with devoting at least a fortnight of the preliminary drill to the musketry practice, and coupled also with what I insisted upon—the necessity of each regiment containing in itself the means of imparting that instruction—will, I believe, do a great deal to remedy the difficulty existing.

Sir James Alexander has properly alluded to the question of economy. I should be the last person to discourage the exercise of proper economy in Militia regiments, but in some military papers I have seen a little tendency to treat Militia regiments as if they were simply schools for educating young gentlemen for the Line, and that, therefore, it was our duty to accommodate ourselves entirely and purely to their necessities. I think it should not be forgotten that the first duty of the Militia regiment is to see to itself and its own requirements and efficiency, and as to messes, I think it would be injudicious to press the question of economy too far, because it must be remembered that in many Militia regiments, the great majority of the Officers are men of large or considerable means; they are living in their own county, among their own friends, and it is their duty to keep up the social position of their regiment by a certain modest amount of entertainment. Supposing these regiments to be permanently embodied, then, of course, it would be for them to carry on their messes on the strict economical system that properly prevails in the Line, but during four weeks' training in their own county it is impossible to keep them down to that.

I thoroughly endorse the allusion made to the serviceable character of the Glengarry bonnet; but it is a question really of military pride and prestige. If the Glengarry be adopted by all arms of the service as the proper full dress wear for parade, no one will object to it less than myself. What I do object to is that the Militia shall appear in what is the undress of the Army, while the Army and the Volunteers appear in full dress.

General Robertson referred to the possibility of training Militiamen in musketry

on the system of the Volunteers. The Militia differ so much in their local character that I am unable to say that would be impossible in some cases; but as far as my experience goes, I think it would be attended with great difficulty. As General Robertson has been good enough to allude to a muster parade of my own regiment, which he witnessed, I think I might mention what really was done on that occasion, because it answers objections which I have often seen in the public press. I have often seen it stated that the training is utterly insufficient, being only twenty-seven days, of which the first three are devoted to the giving out of clothing, stores, and arms. On the occasion to which General Robertson alludes, the men of my regiment began to come to the barrack yard at 10 o'clock; at a quarter past 1 they paraded in marching order, and marched into camp, a distance of a mile and a half; they had a cleaning parade at 3 o'clock; a parade in review order at 5.30, every man clean, his hair cut, and clean shaved, except the upper lip. They marched past in slow, quick, and double time; they performed the manual firing and bayonet exercises, and various battalion manœuvres. On that occasion I had no Adjutant, one of my own Officers acting as Adjutant; and neither he nor any other Officer on the ground had ever served in the Line. The whole also of my colour-sergeants were absent, owing to the detention of a train by which a number of men were expected.

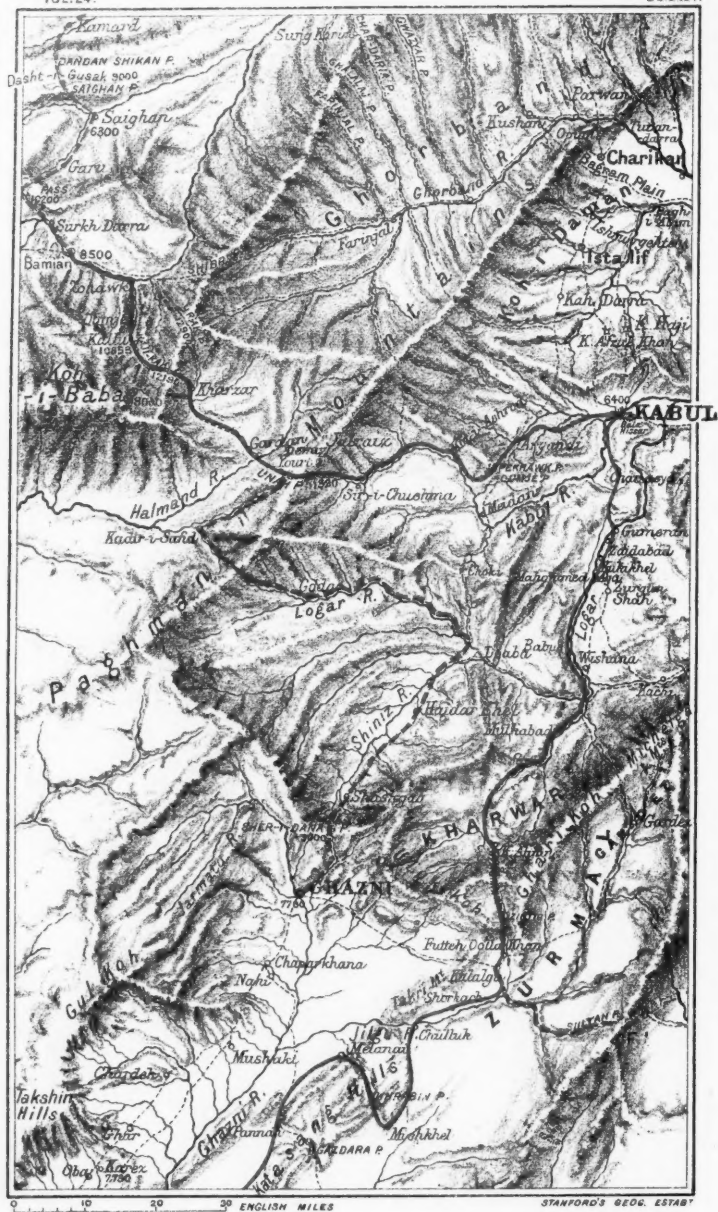
Colonel Lloyd-Lindsay very rightly mentioned that some of the reforms which I suggested were impracticable on account of entailing expense. Well, I made them as modest as I could. I cannot help thinking that this rich country, if the case were fairly put to it, would not grudge the money that is absolutely necessary for making our armed forces efficient; but if it is a question of our only having so much money to spend, I would rather see a reduction of the rank and file of the Militia to the extent of 5, 10, or 15 per cent., and the money spent upon making the cadres of the regiments thoroughly efficient. Colonel Lindsay also spoke of what is certainly the greatest existing evil of the Militia—fraudulent enlistment. It is called very often desertion, but that really is a misleading term, because Commanding Officers of Militia and depôts are well aware of the fact that there is very little of desertion among men who have once joined the regiments; what is called desertion is a trade carried on by a class of men who have no intention of joining, whom we call "bounty jumpers," and who go from one barrack and depôt to another simply for the sake of getting the ten shillings and departing, and no punishment can be too severe for them when they are caught. Colonel Lindsay suggested that there should be greater stringency on the part of Adjutants examining these men; but I am bound to say that the difficulties of the Adjutant are enormous. It is a class of fraud almost impossible to detect. There is another class too of men who are more difficult to deal with, still men hitherto respectable, who go and get the ten shillings and then go off to America, using it to help pay their fare. With reference to another of his suggestions, Commanding Officers already have the power to allow men to remain away from training. I constantly give them leave of absence for a large part of training, and I am not at all certain whether it might not be a very good arrangement indeed to allow men who have re-attested to come up only for the last fortnight of the training; it would involve a considerable amount of trouble to the permanent staff, but it would be a very great inducement to remain, because at that time of life they get permanent employment and they find it difficult to remain in their regiments. I think that system would encourage re-engagement and keep this most valuable class of men in the Militia. There is one element of strength in the Militia which people are apt to forget. There is a very large number of men passing through the Militia every year; a great majority do not re-engage, but we must remember that they are still in the country; and I believe at this moment if the Militia were required for permanent service, by offering a considerable bounty we could at once call back into the ranks at least 20,000 fine, trained, seasoned soldiers who would be a most valuable addition to the force.

Sir WILLIAM CODRINGTON (who had taken the chair): I am sure we shall agree that our thanks are due to Colonel Walker for his interesting lecture, and the discussion resulting therefrom. It has given a great deal of information to the regular Army, to the Volunteers, and also to the Militia. I am sure I may convey our cordial thanks to Colonel Walker for his lecture.

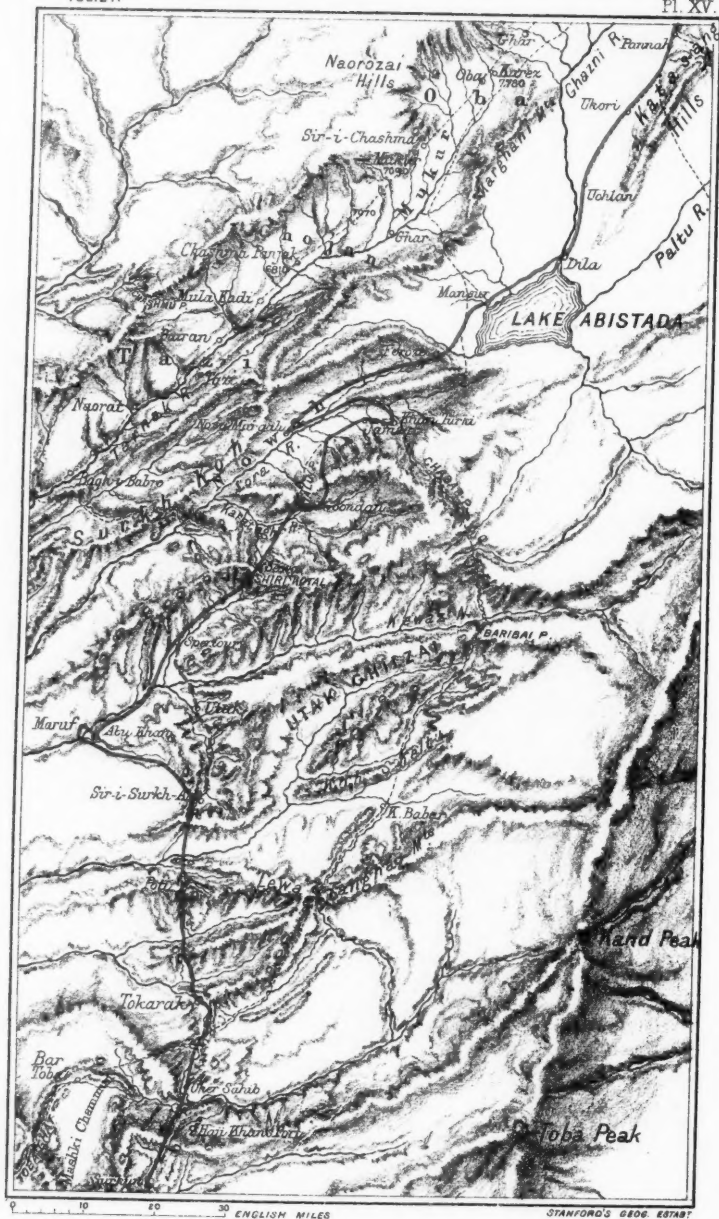
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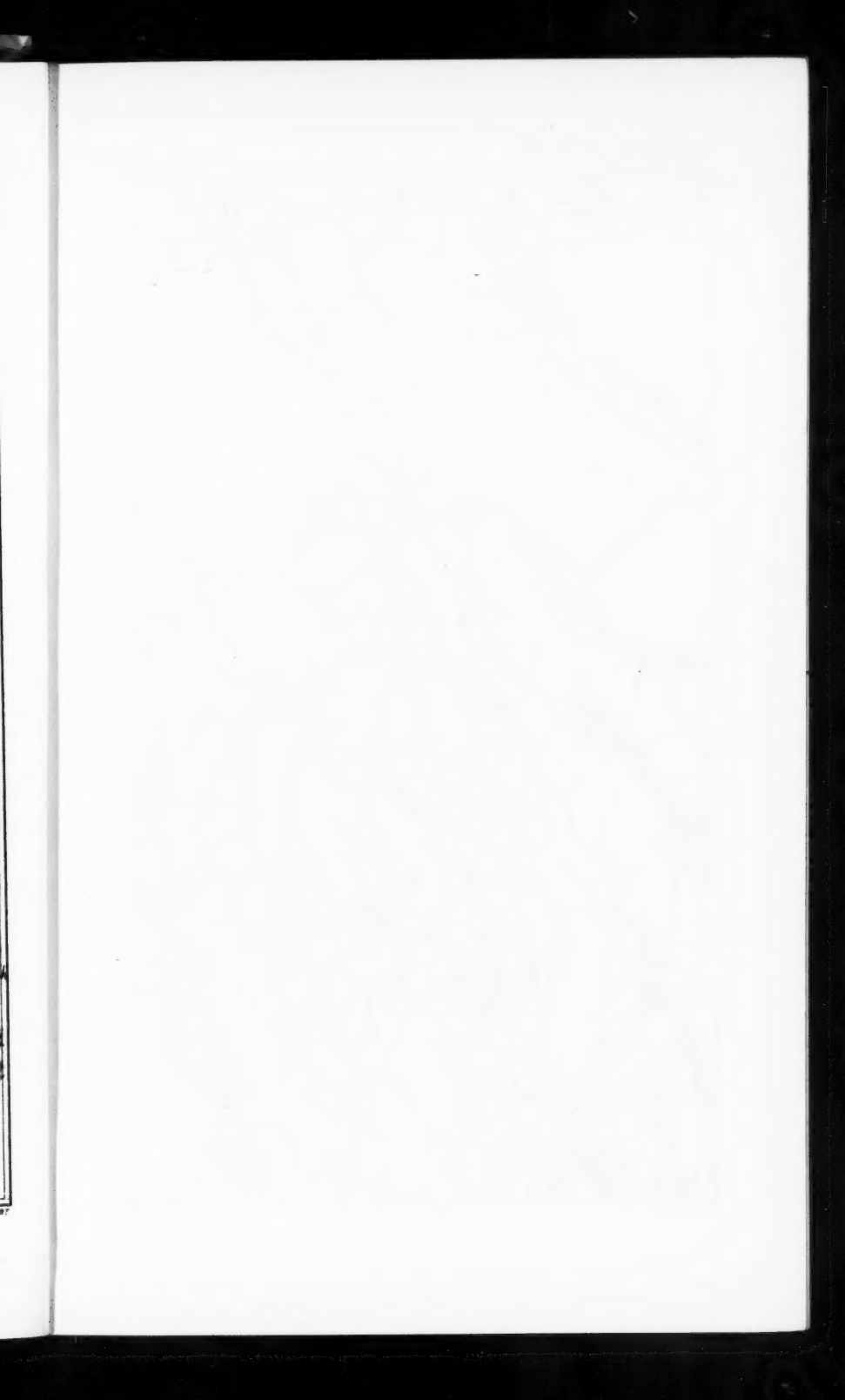
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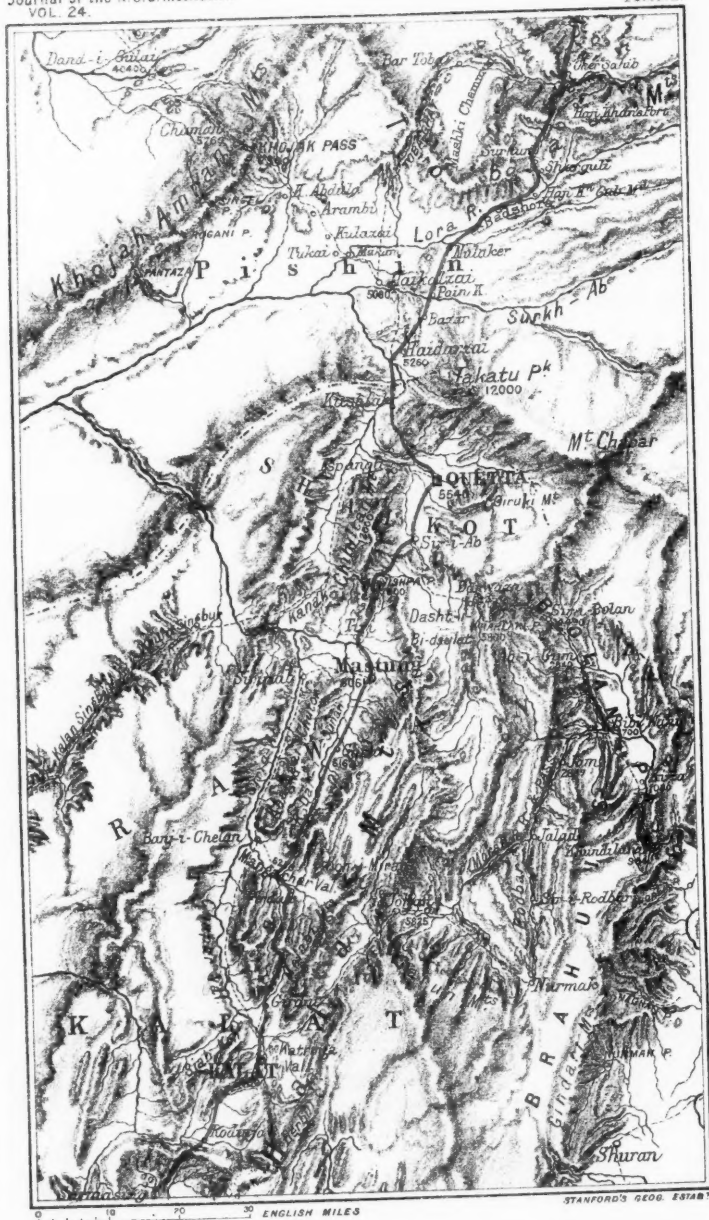
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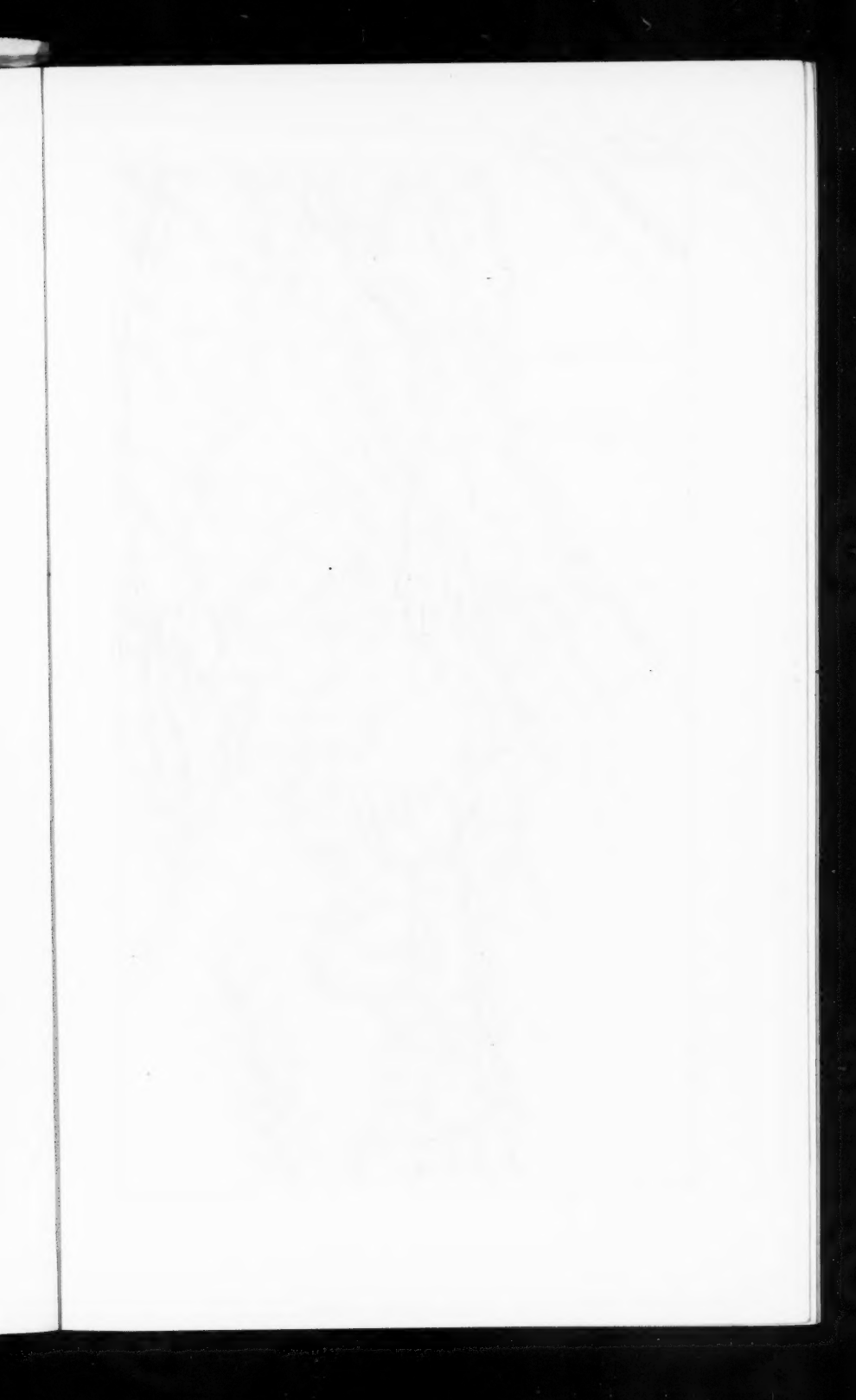


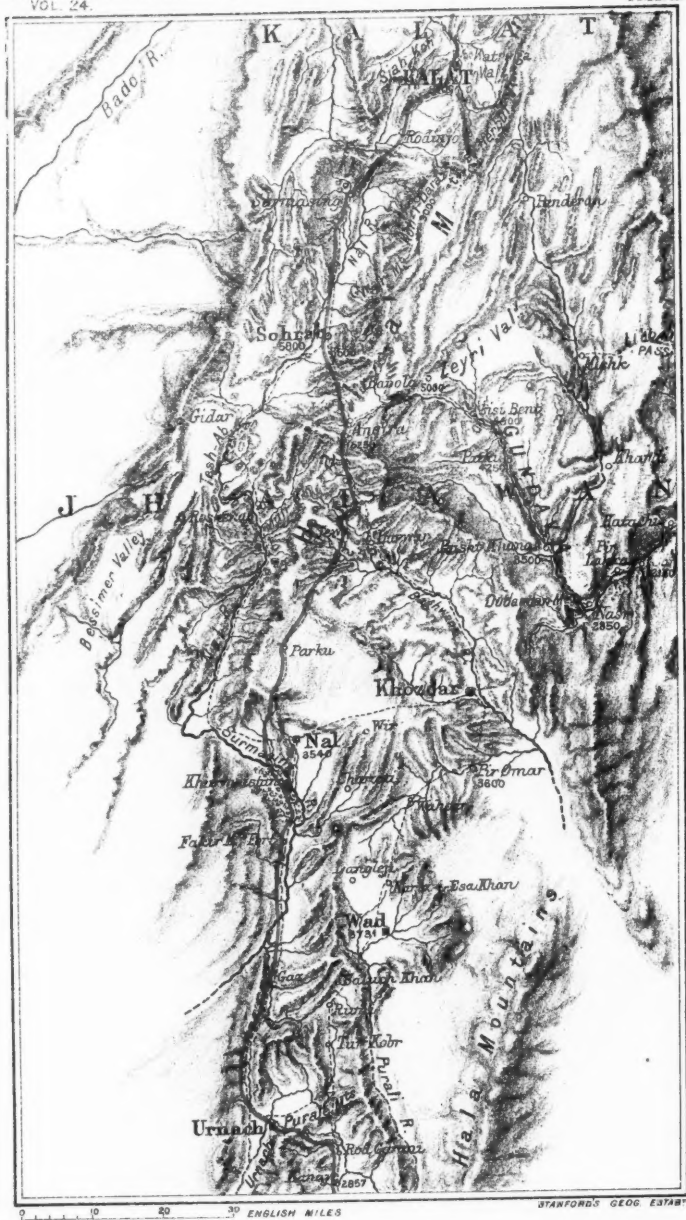




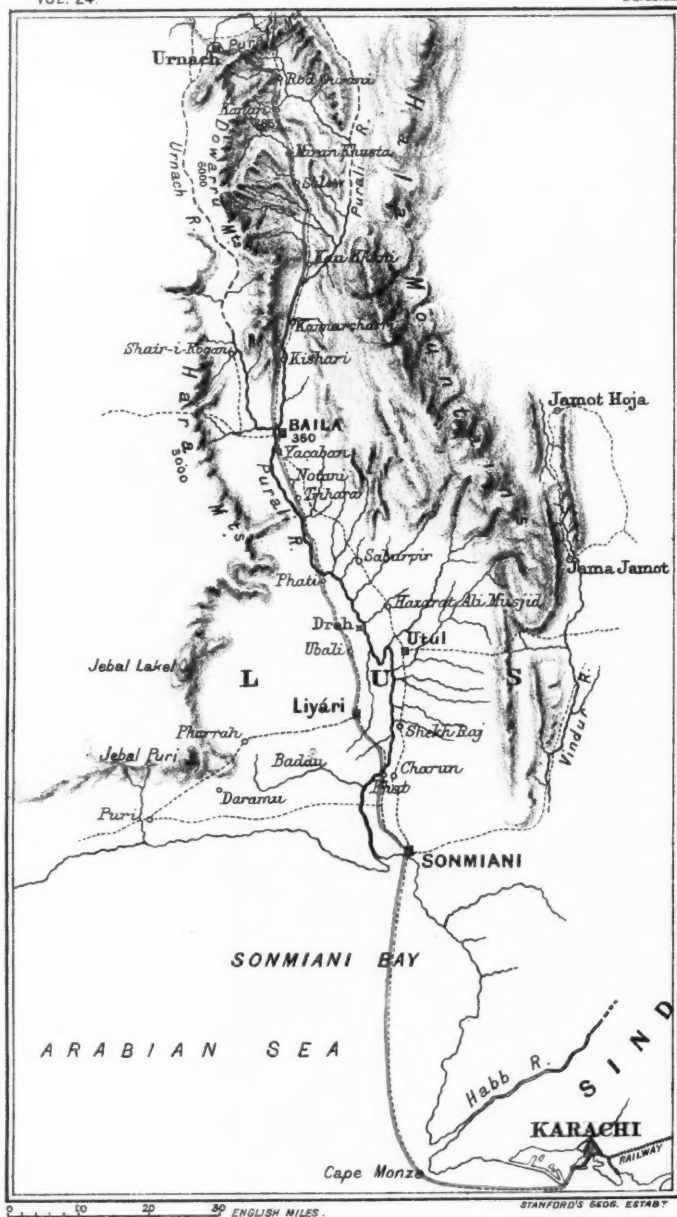












Friday, June 18, 1880.

Sir RICHARD TEMPLE, Bart., G.C.S.I., C.I.E., in the Chair.

“FROM BAMIAN TO SONMIANI.”¹

By MAJOR-GENERAL Sir FREDERIC J. GOLDSMID, K.C.S.I., C.B. &c., &c.

IN preparing for the press the “Life of Sir James Outram,” to be issued in the course of the present month, I was much struck by the length and arduous character of the journeys which that Officer accomplished in little more than three months of 1839, both in Afghanistan and Baluchistan. His return from Bamián to Sonmiáni, for instance, was a matter of 800 miles, allowing for deviations from the ordinary line of traffic between Kabul and Kwatta; yet this distance was traversed in 104 days, or from August 12th to November 23rd, during which he carried out a whole campaign against the Ghilzais, and assisted at the storming and capture of Kalát. Space did not admit of any very detailed notice of this episode in Outram’s brilliant career in the text of a biography; so it has occurred to me that a few words on the subject might not be deemed out of place in the theatre of this Institution, nor possibly unsuited to the pages of its Journal. Moreover, the interest attaching to Afghanistan is naturally greater at the present day than in a period of less marked political transition. Our relations with that country are to a certain extent critical and undetermined; for whatever orders may be issued or policy pursued—in every forecast of coming events, place must be reserved for a chapter of accidents. In any case, whether we advance or retire, annex or abandon, we cannot stand still. I think, therefore, you will agree with me, that if, by reconsidering an old and almost forgotten page of Indian history, we draw attention to, and obtain any enlightenment on those tracts which are the least known to Afghan cartographers and which have not been traversed in the late campaigns, we shall not have spent an unprofitable hour.

Before commencing the narrative at the period of Captain Outram’s departure from Bamián, let us glance at the circumstances immediately preceding his arrival at that place. On August 3rd, a few days after the fall of Ghazni, he had left the army of the Indus, under Lord Keane, at the village of Haidar-Khail, on its way to Kabul, where he hoped to rejoin it in camp. He had been just appointed to command a suddenly-organized expedition of no small importance. Intelligence had come in that Dost Muhammad was in full flight towards Bamián; and it was thought advisable to send Outram in immediate pursuit. Ten British Officers and 100 cavalry, regulars and irregulars, with 2,000 of Shah Shuja’s Afghans, were placed at his disposal. Had half the

¹ The Institution is indebted to Sir Francis Outram, Bart., for the use of the maps which illustrate this paper.

latter number been fairly effective, and animated with half the spirit of their foreign leaders, it is probable that the end would have been attained; but the auxiliary army was composed of many imaginary men in buckram; the real soldiers were but few; and the native commandant was a traitor. Captain Outram's "Rough Notes of the Campaign in "Sindh and Afghanistan," originally printed for the perusal of personal friends, enable us to give a tolerably clear account of the expedition and its result.

"At 4 p.m." the writer tells us, "our party assembled, according to order, at the tents of the Envoy, where the Afghans were also to have been in readiness; but although we waited until dark, not more than 300 effective men could be mustered, the residue of those present, consisting of from 4 to 500 Afghan rabble, mounted upon *yábús*, and starved ponies. It was, however, stated that all who were still deficient would shortly follow, and our detail was for the present reinforced by 100 of Captain Christie's horse."

Bamián is situated at a distance of about 80 miles, as the crow flies, north-west of Haidar-Khail; but a direct course across such country would be an impossibility, so that the journey may be reckoned at 100. The Dost was supposed to be making thither by the road leading from Kabul; and Outram's wish was to intercept him by reaching that road at a convenient point to the westward. Hajji Khan Kákar, however, his faithless native associate, proposed moving due north, to a village in the *maidán*, or "plain" district, thence turning westward along one of the more frequented tracks connected with the capital. As to have sanctioned such a proceeding would have considerably diminished the chances of overtaking the object of their pursuit, who had already had a start of 24 hours, Outram insisted on attempting the more direct route, and would listen to no modified arrangements. Accordingly, they "marched during the first night about 32 miles, crossing several ranges of hills, and winding along the channels of many rivers, until 7 a.m.," when they reached Goda, described as "a small village * * in a confined, but fertile valley." Not more than 100 of their Afghan escort came up at this time, but the rest dropped in during the day, "bearing unequivocal evidence of the cause of their detention, in the plunder with which they were laden." The word *godar*, which is commonly used for a "pass" in the whole region between Karmán and Karáchi, may explain the name of a place situated at the foot of the mountain range where the track indicates the practicable thoroughfare.

The next evening they marched again. After accomplishing ten miles of bad road "along the channels of mountain torrents, and the "face of precipitous hills," they bivouacked until two in the morning, awaiting the rising of the moon. A five hours' march then brought them to another small village, called "Kádir-i-Safid," on the western side of the Paghmán range which they had surmounted by a steep and lofty * * pass. Barely 50 of the Afghans had come up, but as before, the stragglers joined during the day. Information was here received that Dost Muhammad was at Yourt, a village one march in advance, and on the road between Kabul and Bamián; but Hajji

Khan made this a plea for halting, and urged the necessity of sending back for a reinforcement. The Amir, he declared, had upwards of 2,000 followers, and could not be encountered by the small body of men under the British Officers with any hope of success. Setting aside the argument as futile, Outram ordered a muster of the Afghans in the afternoon. At sunset, they had got together 750, but only 300 of these were respectably horsed for service.

By dint of threats and persuasion, the third march was begun; but the men had hardly advanced four miles, when it was reported that the guides had deserted. The night was pitch dark; the detachment was left "in the midst of interminable ravines, where no trace even of "a footpath existed;" no alternative offered to a halt until daybreak. Yourt was not reached until 7 a.m. of the following day. Here Outram learnt that the Dost was at Kharzár, only 16 miles farther on. and entreated the Hajji to push forward; but all efforts were vain to induce his men to stir. At length, he promised to proceed in the evening. When evening came, and the British Officers were in the saddle, their guide repeated the story of the forenoon; there was nothing for his followers to eat; they would be in no condition to overtake the Dost, who was at the head of 2,000 men; so he deferred movement until the morning. That night again, he came to Outram's tent, and renewed his arguments in favour of awaiting re-inforcements, hinting that the Afghans with him were not all to be depended on, while their opponents were desperate, and determined to fight to the death. Failing to gain his end, he adopted the truly Oriental expedient of sitting outside the tent door, and conversing in an undertone with his chiefs. "The latter," we read, "were overheard "to upbraid him for assisting the Faringis in their endeavour to "arrest Dost Muhammad Khan, inquiring whether the Amir had "ever injured him—and, although the result of their deliberations did "not transpire, Hajji Khan was heard to admit the truth of all "they had advanced. It rained and hailed violently during the "night." Outram's escort had been subsisting for two days upon a little parched unripe corn. They were then on the Kabul and Bamian road; on the Bamian side of the Unai, a high, but not very steep pass over the Paghman; among the sources, and about to cross the main source of the Helmand river.

The following day, the fourth of the expedition, they marched at dawn. On reaching Kharzár, there were traces of the previous day's encampment to be seen, but no Dost Muhammad. The Amir had continued his flight towards Bamian. On went Outram and his countrymen with their own particular escort, but Hajji Khan and his Afghans remained behind. Scarcely had they started, when they were met by intelligence that the Dost was at Kalu, the next stage; whereupon Outram rode back to apprise the Hajji, and entreat him to bring up his Afghans without delay. Not succeeding in the attempt, he resumed his adventurous march and, after a nine hours' ride during which they crossed the Hajji-Gok, or perhaps Hajji-Khák Pass, at a height of 12,000 feet,¹ with snow

¹ 12,096½ is the mean height according to the estimates of Wood, Griffiths and Burnes.

observable 1,500 feet beneath—the party entered Kalu to find that the object of their pursuit “had departed so many hours previously,” and “must ere then have surmounted the Kalu Pass, the highest of “the Hindu Kush.” Their encampment was at the foot of the Kuh-i-Baba, the peak of which (the loftiest of that noble range), is stated by Outram to be “elevated 20,000 feet above the level of the sea, and “covered with eternal snow.” The Kuh-i-Baba, however, is a term applied by geographers to a continuation of the Hindu Kush and, in that sense, is crossed by the Hajji-Khák Pass just mentioned, as also by the Irak on the east, or the Pasht-i-Hajji Khak on the south of the Hajji-Khák—according to the season of the year. Wood considers the last to be the best of the three roads, though it is only open to caravans in July, August, and September. At the village of Kahzar, south of the Irak, the road divides—the track to the left leading over the Hajji-Khák and Kalu.

Early the next morning they were joined by Captains Taylor and Trevor, “with a reinforcement of 30 troopers, and about 300 “Afghans;” and Hajji Khan Kákar reappeared on the scene. This professed helper and adviser at once resumed his old practices, and used all his endeavours to detain Outram, even withholding the guides when he prepared to set out. But the small escort could now act independently of their so-called allies, for they were on the caravan road. So, pushing on across the “Shutar Gardan,” to within a march of Bamián, they halted on the banks of a stream running into the Oxus. This “Shutar Gardan,” or “camel’s neck,” is a name given in Afghanistan to more than one mountain pass, and corresponds with the “Deva Boiyún” of Asiatic Turkey. Doubtless the geographical feature is so described from its supposed similarity to that part of the useful animal’s body which is indicated. Outram’s estimate of its height makes it 3,000 feet above the Hajji-Khák; but this would seem to be somewhat too great an elevation. The “Kalu,” probably the same pass under another name, and mentioned by Burnes and Moorcroft, is said to be 12,480 feet.

Hajji Khan had sought to convince his English associates of the improbability that Dost Muhammad would attempt to escape from Bamián, beyond which place the roads had been closed against him; and now that the goal was so near at hand, he protested against the night march which they had proposed. Speaking of his own immediate followers, he said, “In broad daylight I may be able to take “them on, but if you do encounter Dost Muhammad Khan, not one of “the Afghans will draw a sword against him, nor will I be responsible “that they do not turn against yourself in the *mêlée*.” The horses had been knocked up by the day’s work, and it was finally resolved to await patiently until daybreak. Two Officers, however, were sent in advance to reconnoitre the Amir’s movements, and a council-of-war was held to lay down a programme for the morrow. This done, the occupants of the single *rautis*—or perhaps eleven of the thirteen, deducting the temporary absentees—passed a happy night under the exciting expectation of a decisive *coup-de-main*, so full of romance and perilous adventure that its realisation would have been a fortune to a

capable chronicler. Irrespective of daily vexations and trials, and the scantiness of their accommodation, they deserve credit for preserving a cheerful temper under circumstances of considerable discomfort. We read that they had "little to eat, nothing whatever to drink, and no bed on which to lie, saving sheepskin cloaks." Had they known of the disappointment in store, they might not have been so patient. At dawn, when in the act of mounting their horses, information was brought to them that the Amir, instead of halting on the previous day at Bamián, had pushed on one march in advance and was about to proceed still farther—for he had determined to seek the protection of an independent Uzbek chief, outside the limits of Shah Shuja's Government. Arrival at Bamián, and the presence there of some 70 horsemen dismissed from the Amir's service, enabled them to obtain confirmation of this dispiriting intelligence. According to Colonel Durand, there may have been discretion in the Kakar's efforts to delay the passage of the Kalu. "Akbar Khan, 'with a party of picked men,' he writes, 'kept the top of the Pass for 24 hours after the departure of Dost Muhammad and his family; and had Outram, with a few straggling troopers, whose horses were worn out with the fatigue of surmounting lofty mountain-passes, 'reached the summit before Akbar Khan had moved off, the latter 'could not have failed roughly to handle his pursuers.'"

Three unsatisfactory days were spent in the vain hope of receiving a reply to a letter addressed by Outram to the Chief accompanying the Amir. There was afterwards no course left but to return to the Head-quarters' camp, which they expected to find pitched at Kabul. We now begin the journey from Bamián to Sonmiáni, the whole extent of which seems to possess interest at the present hour. I propose to consider it in three sections only:—Bamián to Kabul; Kabul to Kwatta; Kalát to Sonmiáni. The link between Kwatta and Kalat is tolerably well known.

The first three marches to the eastern side of the Hajji-Khák Pass were over the same ground as already noted. Twelve miles are reckoned to the foot of the Kalu along the channel of a stream falling into the Oxus. Another 12 miles brought the party across the Kalu to the foot of the Hajji-Khák, the ascent of the former "occupying two-and-a-half, and the descent one-and-a-half hours." Eighteen or nineteen miles farther, they had crossed by "an easy ascent of about half-a-mile," the top of the Hajji-Khák, where they found the pools frozen, and passed "by the bed of a stream the whole way," to Gardan Diwal on the Upper Helmand. On the fourth day the march was thus described:—"To Sar-i-Chashma, nominally the source of the Kabul River, but we had in reality followed a rivulet for 10 miles before reaching these copious springs which here unite with it. Five hours in the saddle. Estimated distance 17 or 18 miles, the first five or six leading over numerous steep stony ascents and declivities to the summit of a pass, the name of which has escaped me, and thence descending the whole way through a narrow valley." The pass is undoubtedly the Unái; and as to the "Sar-i-Chashma," literally "fountain-head," Colonel Macgregor has mentioned the fact,

also apparent from maps, that there may be "another source about 12 miles farther west, on the east declivity of the Unái ridge"—independently of other tributaries to the Kabul river observed in the same locality. A march of 17 miles to Kot-i-Ashru, and one of 20 miles over the "Oomje" Pass, completed the distance to the capital. I am a little uncertain as to the direction of these 37 miles, or how far removed is the "Oomje" from, should it not be identical with, the "Arghandeh Pass." The latter, we are told, may be avoided by the traveller from Kabul to Bokhara, if he take the Ghazni road as far as Maidán, and then march up the Kabul river.

Outram makes the whole distance from Bamián to Kabul 96 or 97 miles; whereas other authorities reckon it as much as 107, or even 112. But the precise routes followed may not have been the same; and we have shown that there are two or three used by *káfílas*. In any case, we are treating of a most important outlet from Kabul into Turkistan, of which Bamián is a significant landmark; and it is well to know that this particular section of a highway reaching to Tashkand, however short, is not one to be traversed at all seasons, nor easily at any season. In the first Afghan War, owing to the difficulties presented at the comparatively low Pass of the Arghandeh, 15 miles out of Kabul, a troop of horse artillery took seven hours to make a march of eight miles; and nearer Bamián, as it has been shown, the passes increase threefold in importance.

Three or four days after his arrival at Kabul, the services of Captain Outram were temporarily placed at the disposal of the British Envoy and Minister with His Majesty Shah Shuja'u-l-Mulk, "for the purpose of conducting an expedition into certain disturbed districts lying between Kabul and Kandahar, in order to tranquillise the disaffected Ghilzai tribes, none of whom had yet submitted to the "King." A few days later he received more detailed instructions on the proposed mission. He was to depose, and if possible, arrest certain refractory chiefs and to "establish" certain newly-appointed governors; to punish certain malefactors, and to reduce certain forts, if found to be in possession of the adherents of his late associate, Hajji Khan Kákar, who had been arrested on a charge of treason and conniving at the Dost's escape. It will be seen that a large amount of work was to be done, and a large extent of country to be traversed, before this duty could be fulfilled. But a respectable force was confided to him. There was a wing of the Shah's 1st Cavalry and Gurkha Battalion, with Abbott's battery of 9-pounders from Kabul; to be reinforced from Kandahar by a regiment of the Shah's Infantry, half of the Shah's 2nd Cavalry, and a Brigade of Horse Artillery. Moreover, he had the offer of 1,000 Afghan Cavalry, but his experience of these men, and the difficulties of providing so large a number with forage, and restraining the troopers from plunder, caused him to reduce the figure accepted to 500. These, again, were "divided into small parties varying in strength," and placed under the orders of twenty Afghan chiefs, over whom "Muhammad Usman Khan, a nobleman of great consideration, and uncle to the King," was the head.

We now come to the second division of our subject, embracing the large tract of country from Kabul to Kwatta, east of Ghazni and Kandahar, towns not visited by Outram in his downward march. A glance at the map will show that the line followed is over ground quite distinct from that of which the several stages have become more or less familiar to us through reports made during the present war as in former years. It is a line which, at least in part, owes its place in our maps at all to this particular expedition among the Ghilzais or Ghilji, and Kakars. Let us say one word of these races by the light of present knowledge. The first are described by Bellew as "a numerous and wide-spread people, extending from Jellalabad in the east to Kaláti Ghilji in the west, and occupying the adjoining slopes and spurs of Sufed Koh, Suleman Koh, and Gul Koh (west of "Ghazni)." Up to this day they have remained in a state of quasi-independence of the ruling power, in whatever form displayed, and have habitually exercised influence over the Duráni chiefs. As regards our own relations with them, they have been and now are hostile to our armies, and jealous of our interference in the affairs of their country; but Bellew, whose experience is great, does not look upon the Ghilzai as "an implacable foe to us." He thinks, rather, that he is one of those who "by judicious management can be converted into a very useful friend." It should not be forgotten that from this race sprang an independent Prince of Kandahar, whose son became for a time Shah of Persia; and that it was only after a struggle of years that they abandoned their claim of sovereignty in Afghanistan. The Kákars for the most part inhabit the country in the south-east, and are to be found in the Valley of Pishin and about the Indus frontier. Towards our occupation they have quite recently shown themselves aggressive; but there is no reason to believe that their enmity is general or deep-rooted. MacGregor estimates that they possess from 14,000 to 20,000 fighting men. "They are," he says, "on friendly terms with, and consider themselves brethren of the "Ghilzais." Should Kandahar be retained, I have little doubt they would become as well-behaved as other Afghans—not from the sense of helplessness in the presence of a foreign army, but under the influence of the prestige belonging to civilized government.

I will hazard a parenthesis on this word. Among the many good and sound reasons for retention of Kandahar, it seems to me that one has been comparatively lost sight of; and that is, the "prestige" attaching to its possession. Command of the southern approaches may appear sufficient in a military point of view; but the effect of such a modified position (or half measure) upon the surrounding tribes, as upon all Afghans, and westward of Afghanistan, must fall far short of the mark of the other. The holder of Brentford or Hounslow has not the European reputation of the holder of London. In such respect, not even the occupation of Versailles or Fontainebleau, with their royal and historical associations, has anything like the moral weight of that of Paris. And if deficiency in this matter of "prestige" involves, as it well may, a loss of life (to what extent it need not be determined), is not the consideration military as well as political?

On the 7th October, Outram made his first march to "Chariser, "6½ miles on the Logar road." This, despite the discrepancy of spelling and distance, should be "Chár Asiah," the heights between which place and Kabul were so gallantly carried by the 72nd and native troops, 40 years afterwards, almost to the very day. He continued his march on the 8th to Muhammad Agha, on the Logar river, 15 miles, "through an open valley and over a good road." The next day he halted in the vain hope that his Afghans would come up, for he had left Kabul with no more of the numerical force at his disposal than 300 of the Shah's Hindustani cavalry, and 200 of Skinner's Horse. On the 10th he marched 11 miles to Bábus; on the 11th, 13½ to Mulkabad; and on the 12th, 19¼ to Kala-Ali Jah (or Aliján), in the Kharwar district. The last place was reached over the Kharwar Pass, the ascent by which is described "as three-quarters of a mile in length, extremely steep and difficult, and infinitely worse than that "of the Kohjak." MacGregor has noticed three passes, one east and one south of Kharwar, and one between the two; but evidently not that traversed by Outram, who was detained for some hours getting over the baggage camels. After arresting certain of the relatives, and seizing five forts of a suspected chief; despatching prisoners, and taking the best measures which offered for the future security of a thinly-inhabited tract, which has the reputation of being "a favourite haunt "of robbers"—proceedings which took up four whole days—the party moved into the Zurmál valley. Here, according to the Rough Notes, "some doughty Durrani chieftain was formerly defeated and slain;" and the locality had so dread a character, that "none of the kings of "the country ever ventured to enter into it, unless at the head of a large "army."* * Passing two ranges of hills (no special pass is mentioned), after a march of 17 miles, they arrived at the Fort of Fath Ullah Khan, where they were joined on the day following, the 18th October, by a wing of the 16th Bengal Native Infantry. The Shah's Afghans, it should be stated, had made their appearance in Kharwar, and were turned to account in various ways. Mir Alam Khan, one of the newly appointed Ghilji governors, made himself conspicuously useful and rendered valuable service.

On October 21, Outram made a night march to surprise some "Kanjak banditti," of whom he had heard, among mountains 18 miles to the eastward. These, shown in his "Notes" as "Indran," are doubtless intended for what are known as "Jadrán"; they were described many years ago by Broadfoot, to be "chief of the Sulimán "chain," and a range which "runs north-north-east." The short account of this expedition is thus graphically given :—

"Arrived, as the day broke, at a deep dell occupied by the gang, and "while the Infantry advanced from the front, I despatched the Horse in "two bodies to cut off retreat from flanks and rear. The ground "being very broken and difficult, however, most of the enemy had "found time to ascend a precipitous hill, along the ridge of which they "must have escaped, had I not fortunately been mounted on an "exceedingly active horse, and thus been enabled to gallop ahead, and "deter them from advancing until the cavalry came up. Finding

"themselves completely surrounded, they made a most stout defence, and maintained their position until their ammunition was nearly all expended, when, on a general rush being made from every quarter at once, they were induced to throw down their arms, after 16 of the most desperate of their body had been killed, and several others wounded. Even the women assisted in the fray, by handing ammunition to their husbands, and throwing stones at our troops. The loss on our side amounts to three Sepoys and one horse killed, and two Lieutenants, one Risaldar, one Dafadar, and several men and horses wounded. In the evening we returned with 112 prisoners, comprising some women and children who, with the men killed in the attack, form the whole of the Kanjak gang. Not a soul contrived to escape, and the whole of their arms and property, together with 112 camels, have fallen into our hands; nearly all of the latter bearing the Company's mark, showing that they were stolen from the British Army during its advance."

This extract illustrates so clearly the active character of the work required at the hands of Captain Outram, that we shall confine ourselves to a mere geographical consideration of the remainder of his journey to Kwatta. From the mountain range he appears to have returned westward to the village of Shorkach; thence to have moved from the westward to Chalak, and southward to Mushkhail; thence to have reached Panna to the west, by a northerly sweep (and seemingly across the Katasang hills), through Malinda, turning thence again to the south, and from Panna to have pushed on to Ukori and Ushlan—sending back to Kabul the worked out detachment of the Shah's 1st Cavalry from the former place, and being strengthened by the Pána Auxiliary Horse at the latter. These seven stages amounted in all to 96 miles; and it may be well to see what collateral evidence we have of their respective positions in the map.

Shor Kach is mentioned by MacGregor, quoting Broadfoot, as "a village in the Karoti country," at the source of the Dwa Gomál branch of the Gomál river. The Karoti (or Kharoti) Ghilji form part of that well-known community which, carrying on a large traffic between India and Afghanistan, is generally designated Povindah. Chalak and Mushkhail are shown by Thornton to be villages situated, one at 32, the other at 40 miles south-east of Ghazni. Malinda is most probably Melanai, reached by a return movement towards the last named town; and if so, it is described by MacGregor, after Outram and Broadfoot, as "a cluster of huts, inhabited by Andars," whom Bellew accepts as a true "Türk" clan. In MacGregor again we find, of Panna, that it is "inhabited by about 500 Andar Ghilzais;" that "supplies for a small force could be obtained" there; that among the adjacent hillocks "are camps of shepherds and Loháni merchants who emigrate in winter—and that 'there is a supply of water from *kárez*'"—this being the ordinary local watercourse. The same authority acknowledges Outram's diary to be his warrant for stating Ukori to be "a village in the Ghilzai country, about 30 miles north of 'Lake Abistáda:'" but quotes Broadfoot only in stating Oshlan to be "two forts in the Ghazni district, with 20 families." Now I maintain

that had it not been for Captain Outram's expedition to the Ghilji, not one of these places would have been found in map or gazetteer at the present day; yet this Officer's work is connected, as it were, with Melanai and Ukori only. The fact is, that Thornton must have got his information from Outram's report or Broadfoot's, and Broadfoot was really employed under Outram.

In February, 1854, Outram, when detained in Calcutta, wrote for Lord Dalhousie's perusal a very valuable paper on the possibility of an invasion of India from the westward. As much of the matter contained in it will be shortly before the public, I will now merely refer to one passage in which he expressed his belief that Government were in possession of "precise information" respecting the Pass entering the Suliman range at Derah Ismáil Khan. The grounds for that belief were that he himself had, "when occupied in the Eastern Ghilzai country, deputed Lieutenant Broadfoot, of the Bengal Engineers, to examine it;" which Officer he certified had "accomplished "the somewhat perilous undertaking very effectually."

Following the pages of the Diary, we observe that it is thus recorded of the march southward from Ushlan :—"Advanced to Dila, 13 $\frac{1}{4}$ miles, "situated on the great Salt Lake mentioned by Sultan Babar, and of "which I estimate the diameter to be about 12 miles. On the banks of "the Ghazni stream, which here flows into it, thousands of dead fish "were strewed." With reference to the latter circumstance Broadfoot explains, that "the fish brought down by the Ghazni river from its "upper parts, on entering the salt part, sicken and die, and may be "taken in all stages of illness by the hand." MacGregor estimates the length of the lake to be 17 miles, and the breadth 15. The elevation Thornton places at 7,076 feet, "taking the height of Ghazni "and the fall of the river as the basis of his calculation." The words *áb-istáda*, meaning stagnant water, "must not be confounded with "the proper name of a place. From Dila, Outram marched the same "evening 17 $\frac{1}{2}$ miles to Mansur, and by pushing on another 12 miles to "Firuz, had completed 42 $\frac{1}{2}$ miles in the twenty-four hours. Mansur is "called by MacGregor, Mansur Karez; and it is said to consist of six "forts" belonging to the Taraki Ghilzais of the Shib Khail section. "It is situated at the south-west corner of the lake; whereas Firuz "is reckoned at about 12 miles to its south."

A busy week now ensued. On October 6th, Outram made a long march to the south-west with the object of seizing a powerful Ghilzai chief in the fort bearing his name, Kala-i-Abdul Rahman Khan, otherwise called Kala Margha or Nawa Margha. Though he succeeded in surprising him in his stronghold, and had made arrangements for an assault on the following day, yet by some mischance the watching officer allowed his man to escape during the night. The next two days were taken up with mining and demolishing the fort, and on the evening of the second day, Outram rode over 20 miles to General Wiltshire's camp at Haidar-Khail. The General was moving the Bombay column in a direct line from Ghazni to Kwatta, and halted a day to enable the new comer to organize a force for further action, leaving him behind on continuing his downward march. He rejoined the

force, however in the evening, and marched with it for the next four stages, Kistni, 12 miles, Goondan, over the Goondan Pass, 11 miles, Sewa, $9\frac{3}{4}$ miles, and Sperioury, $11\frac{3}{4}$ miles. The first of these places may be undoubtedly identified with Kisháni, "117 miles from Ghazni;" the second is the Ghúndáo of the Quartermaster-General's route of the Bombay Army, the Pass being explained by "a road across a low range of hills very difficult for guns;" the third is doubtful, but the last is most probably Spinwari, which Colonel Neill Campbell has explained to be the name given to a district as well as "the ruins of a city near a river in a cultivated valley * * * 156 miles from Ghazni by the direct road."

About 10 miles from Spinwari, on the way to Kwatta, are a few huts bearing the name of the river on the bank of which they are situated—Surkh-áb, the "red water;" and at much the same distance, in the same line, is the Sar-i-Surkháb, a place of encampment near the bed of the above river, which pursues a winding course through a range of hills. The road by the river bed is described as "difficult for guns." This whole distance of 20 odd miles accomplished by the returning Bombay column, was, however, considerably exceeded by Outram, who, in his capacity of soldier-Political, had to inflict punishment on certain Bárákzáis who had plundered and cruelly treated the members of a *Káfila* or caravan proceeding from Kandahár towards India. In order to effect his object, he took out a squadron of H.M.'s 4th Light Dragoons, the Púna Auxiliary Horse, four 24-pound howitzers, some Sappers and Miners, and a wing of the 19th Bombay Native Infantry under Colonel Stalker, from Spinwari to Maruf, a point far to the westward. In fact, the ground he got over was that of two sides of an equilateral triangle, compared to that of the column, which proceeded over the base or third side. For, having secured his recusant chiefs, disposed of his prisoners and destroyed his fort, he rejoined General Wiltshire at Sar-i-Surkháb by a twenty-mile march from Maruf. His next four marches with the General were short. On October 20th, fourteen, and the 21st, eight miles, to places which he has not named, were, according to the Quartermaster-General, to Khúdu Chaman, a native encampment on the banks of a small river, at the foot of a range of hills; and to Kadini, a collection of sundry huts. Before arriving at the first place, we learn from the official report that "the road reaches the summit of the Surkháb range half-way; then descending, comes an undulating valley, in general very difficult for guns." Between the first and second places, it winds by the river bed and crosses another section of difficult hilly country. On October 22nd Gokarak (twelve miles) looks much like a misprint for Tokarak, a halting-place 92 miles from Ghazni, but that in the Quartermaster-General's route there is a distinct "Kotarik." In any case, if there be two, or indeed three places bearing the names respectively shown, they must be very close together. The road, we are told, "crosses another range of hills midway; ascent and descent rugged, stony, and very difficult for guns." Outram describes it as passing "through a succession of mountains which, from their fantastic figures, might be likened to the ocean petrified

"during a storm: excepting an occasional shepherd's tent, no human habitation has been observed the whole way." On the 23rd there was a halt, and on October 24th, the column marched 12 miles and 3 furlongs to Kach Toba, or, according to the "Rough Notes," 12 miles to "Oker Sahib." Next day, the march was of about 8 miles, to near Toba, one of the forts of Hajji Khán Kákar, which was found by Outram to be deserted. The three following marches were to Shah Kuli or Shahr Galái; Barshuhra, or Barshora, and Surkháb the fort of Páiyanda Khan, mainly along a river bed through hills, but ending in the "extensive and cultivated plain" of Peshin. Outram's distances are a little in excess of those shown in the Quartermaster-General's route—40 instead of 38 miles for the whole distance. At the gorge of the Pass traversed on the road to Surkháb, was another and a larger fort of Hajji Khan. This, although not occupied when first reconnoitred, it was afterwards found necessary to demolish, owing to the conduct of the Kakars, who had threatened our baggage and cut down our followers. To accomplish so desirable an end, Outram was detained for two days; and he had to make a double march of 25 miles to overtake the General at Kushlak (Kujlak?) on the 30th October. On the 31st he marched in with the column to Kwatta, about 11 miles. Since entering the plains of Peshin, they had come upon several villages and forts, cultivation, and fine streams of water.

It will be foreign to our purpose to give any particulars of the siege and capture of Kalát, which occurred on the 13th November. The event is circumstantially related in history, and Outram's own account has been reproduced in the pages of his Life, he himself having acted a conspicuous part on the occasion. We may note that the road from Kwatta to Kalát is not given in detail by that Officer, whose journal of the first seven marches he states to have been mislaid. But it is no sealed book, and has been frequently traversed and described by Englishmen.

We now come to the third and last section of the "Journey from "Bamián."

At the termination of the siege, Captain Outram was relieved from military duty, and had to make the best of his way to Bombay in charge of General Wiltshire's despatches to the Government of that Presidency. He would, however, not return by the route he came, or through Sindh at all, but endeavour to keep to the territory of the Khan of Kilat and his quasi feudatory, the Jám of Baila, reaching the sea at the port of Sonmiáni. There were two roads by which this was to be effected; the more easterly one passing through Khozdar and Wadd, the other through Nál, said to be the better for caravans. The first had been traversed and reported on by Colonel Pottinger in 1810, nearly thirty years before. Outram therefore resolved upon exploring the Nál route; he rightly considered it to be a "point of great importance to ascertain the existence, or otherwise, of a practicable road for troops from "Kandahar and Shál, through Baluchistan, *viâ* Kalát, to the sea;" and General Wiltshire's views agreed with Captain Outram's.

Colonel Pottinger and Captain Christie had proceeded upward, it

may be remembered, from Sonmiáni, in the assumed characters of agents to a Hindu merchant, disguising themselves, in the first instance, by partly changing the European for the native dress; afterwards, by shaving their heads and adopting the entire native costume. They passed through Baila, the capital of the Jám's country, and by the bed of the mountain-river Úrnách. It is apparently between these two points that the road bifurcates, and that the earlier travellers took the direction of Túr-kabar and Wadd. At Khozdár they met with an Afghan trader, purchasing sheep to be driven up to Kandahár, a distance of some hundreds of miles. This person, we are assured, after sitting for some hours with the two Englishmen, left them under the impression that they were what they represented themselves to be—in other words, "fully satisfied" that his new acquaintances were true Musalmáns. At Sohrab, the road from Nál fell into their own. Thus, for the eighty miles or so between Sohrab and the junction to the southward, we must limit the extent of the alternative tracks. The rest of the distance between Kalát and Sonmiáni is—with one slight exception near the sea—to all intents and purposes accomplished by means of the same road.

Outram adopted the Afghan costume, and was accompanied by two Saiyids of Shal and their two armed attendants, together with one servant of his own. Six in all, they left the British camp in the dead of the night, mounted "on four ponies and two camels," taking provisions for themselves, and as much grain for the animals as could conveniently be carried. They started on the 15th October, a day earlier than intended, so that they might precede, if it were possible, the tidings of the death of the chiefs of Wadd and Nál, both of whom had been killed in the combat which ended in the capture of Kalát by the British. On the 16th, after a moonlight ride of four hours, they halted at Rodinjo, resuming their march at day-break to Sohrab, a cluster of villages. Both localities were deserted, owing to the winter, when migration to a warmer climate is thought desirable. During the march they had been joined by "many groups of fugitive women" "from Kalát," who recognised and addressed the Saiyids, a circumstance which placed our traveller in an awkward predicament; for one of the families thus brought into contact with him was that of the Khan's minister, killed at the siege, from whose wardrobe the prize agents had issued the very raiment in which Outram was attired. They bivouacked with intent to stay the night among the walls of a deserted village; but the intrusion of inquisitive strangers determined them not to await the dawn, so they shifted their position to a stream of clear water six miles farther on their downward road. Altogether they had been some 19 out of the 24 hours in the saddle. On the 17th, they continued their journey during ten hours to Parkur, where, among the ruins, they found a so-called "comfortable asylum for the night," and "were exempted from the "society of strangers." The next day was one of mishap and inconvenience. They had to pass Nál without going into the village, remaining in concealment in the jungle three miles beyond; and the members of their party, detached to procure grain, missed their

hiding-place. Eventually, however, all came right; they pushed onward again and, out of the day and night, were 17 hours in the saddle. On the 19th, they bivouacked in the bed of the Urnách River, where a little green grass enabled them to give their horses "the first forage" they had possessed time or opportunity to procure, "the poor beasts having subsisted upon a scanty allowance of "grain brought . . . from Kalát" and afterwards added to at Nál. "On our entering that valley," writes Outram, "the sight "of the luxuriant green tamarisk bushes was really quite refreshing, "forming as they did the most agreeable contrast to the brown and "stunted vegetation of Afghanistan, which ever seems as though it "had been scorched by fire or blighted by frost. With exception of a "few juniper bushes in the Kakar Hills, this was indeed the very "first green foliage that I had seen since leaving Kabul; and its appearance, together with that of mat-rushes, and many familiar "Indian trees, such as the *Babul* and *Neem*, of which I had entirely "lost sight after entering Afghanistan, served not a little to enliven "my last night's moonlight march. To me, even the scanty yellow "grass on the side of the hills which bound the Sohrab Valley proved "a gratifying sight; for nowhere betwixt that place and Kabul is "grass to be found growing wild, saving where it occasionally fringes "the running water-courses. During this day's march we saw neither "a human habitation nor a human being."

Outram's own words may now be quoted freely, to describe the remainder of the journey into Sonmiáni:—"The moon was almost at "the full, and we marched at midnight of the 20th, in a sequestered "dell, lying in the very heart of the hills, and seemingly quite "isolated from the rest of the world by the wild sterile mountains "surrounding it: we passed several fields of *jowári*, the first I had "beheld since leaving India, and also some straggling hamlets. "Notwithstanding the peaceful appearance of their secluded abode, "the inhabitants of this valley are represented to be a particularly "wild and savage race, and we therefore passed silently on our "way, without communicating with, or arousing a soul. We next "surmounted the Purali range, which appears to be higher than that "styled Urnách; and here my hopes of the practicability of this route, "which had hitherto been sanguine, were completely extinguished. "The road over this pass, which I saw no means of otherwise "turning, is a path so narrow, steep, and rocky—sometimes winding "along the sides of precipitous hills, at others through narrow "fissures in the hard rock—as to be utterly impracticable for guns, "and incapable of being made so, unless at immense cost of time "and labour."

From the sketch map accompanying the "Rough Notes," it is quite clear that the above noted Pass over the Purali Mountains and Pottinger's Bárán Lúkh, or "Rain Pass," are quite distinct localities. It is not improbable that our distinguished chairman may have had occasion to ask information hereon, in the course of his recent investigations into the practicability of the Sonmiáni routes. Pottinger places the bottom of his pass 14 miles north of Khánaji, and

mentions that he was "about an hour and a half ascending to the "top of it, where the path for one hundred yards or upwards is very "narrow, and would almost seem to have been excavated through the "solid rock." There was no descent from the summit, and he continued his way towards Khozdar and Kalát, along a stony plain to the bed of the Ūrnách.

After 11 hours in the saddle, Outram dismounted and, with his companions, passed the day in a ravine, affording "a scanty supply of "water and a little green pasture for the cattle." He relates how the "Bombay Times," which he then took occasion to read, had been obtained from the hands of a Baluch who, ere the heat of action had abated, held it up to a party of soldiers, in default of more orthodox vouchers, as a warrant for considerate treatment; and he adds that he was surprised in his reading by the apparition of a ferocious-looking native, "armed with a long matchlock," whom he suddenly perceived scanning him from the top of the bank. In the evening he pursued his journey for some hours over a range easy of ascent and descent. He continues:—

"The road generally wound along smooth firm sandy beds of dry "water channels which, in their descent, gradually widened to the "expanse of a magnificent river, though totally destitute of water. "The banks are sometimes flanked by sloping hills, and skirted with "shady tamarisk trees of gigantic growth, at others hemmed in by "bare perpendicular rocks of great altitude. In the former case the "hills generally open into wide valleys; in the latter, the iron-girt "walls contract to a narrow channel." Except the mysterious visitor specified, he did not see a single inhabitant of the country during that day's long march of 18 hours. "The bold mountain scenery "throughout the whole distance, alternately cast in deep shadow, and "next lighted up by the brightest moonbeams, was striking and "beautiful; and in many clumps of the 'prickly pear,' I had the "pleasure," he says, "of recognising an old Indian acquaintance "which conjured up pleasing reminiscences of boar and tiger hunts." A march of $9\frac{1}{2}$ hours the next day, advanced them nearly 30 miles on their way to the sea. They bivouacked on the bank of the Purali River, and Outram's natives profited by the opportunity afforded to indulge "in a fatted lamb." He himself continued to observe his usual diet of dates and water, not to infringe the rule of abstinence befitting his assumed character. Rising early on the morning of the 22nd October, they sought to pass Baila before dawn, but were delayed by the provoking inquisitiveness of the members of a caravan met with outside the town. In the evening they resumed their march and, travelling through the night, reached Sonmiáni, by the Liyári route, at 10 in the forenoon, having been 14 hours in the saddle.

There are, no doubt, great physical obstacles to be overcome to make the road available for military purposes between Sonmiáni and Kalát; but it must be remembered that nearly 40 years ago it *was* found practicable for the passages of troops and, I believe, guns. We have yet to learn the result of recent experiences, and whether any more promising tracks than those through Nál and Khozdar have

been discovered, to facilitate the transit. I am informed, on excellent authority, that a troop of Horse Artillery and two companies of the 41st Regiment marched from Mustang, *viâ* Kalât, to Sonmiani in about September, 1841. How the former fared, particulars might doubtless be obtained; but none have been supplied to which I can at this moment refer. As to the infantry, I learn that they experienced no special difficulty; they had been provided, for purposes of carriage, with 850 camels collected in the neighbourhood of Mustang.

The town of Sonmiani I have myself visited when *en route* from Karachi to Gwádar on the Makrán coast. A few notes made upon it in 1862 may not be inappropriate; but as regards its trade and natural resources, I must refer for detailed information to those more capable of satisfying natural curiosity on so interesting a subject. Sonmiani suggested to me the idea of Karáchi prior to British occupation, being little more than a fishing village, as its name "miáni" implies; why the prefix of *son*, "gold" should be accorded to it seemed hard to divine. The houses were built of mud and few had a substantial appearance. The *bádbán*, or ventilator, was seen on the roof of the greater number, yet the climate can be little different from that of Karáchi. The thermometer during our stay (in December), ranged from about 64° to 80° in the day-time. There were there about 300 houses, of which at least one-third were Hindu. Beside these, consisting chiefly of Banyas of the Loháno division, there were a vast number of Mohános or fishermen, and some Mehmans and Khojas. The customs were farmed at 13,000 rupees for two years. Articles coming from the interior were taxed an *ad valorem* duty of one anna in the rupee, half of which was levied at Baila, and half at Sonmiáni. The same practice prevailed with the land traffic from Karáchi, the half exaction having effect at a midway station. The harbour has long ago been pronounced by scientific authority unfitted to receive large vessels, which would have to anchor outside, in 6 or 7 fathoms water. This anchorage is, however, unprotected from southerly and westerly winds, and is subject to a heavy ground swell. Lieutenant Montrion reported that there was a bar across the harbour, the channel through which deepened over "into a channel on the eastern shore, terminating at "about 1 $\frac{3}{4}$ mile westward of the town." He added that on the western side of the entrance there was "only a boat channel leading "into a deep-water channel."

The road from Karáchi to Sonmiáni, 49 miles, presents no insurmountable obstacle to the march of troops of all arms; it is broad and well defined for the few miles in our own territory, up to the verge of the Hab river, though a mere pathway on the Baila side. Some miles out of Karáchi it rises to the passage of the low hills terminating in Cape Monz; then descends into the valley of the Hab, rises to higher and higher ground up to the Lakh Bedok, and then drops abruptly upon the low ground between the sea-shore and the nearly parallel sandhills. The character of the soil is sandy and alluvial. On the line of march, the prickly pear and wild caper abound, together with the feathered and many common grasses of

Sind; and as Sonmiáni is approached, the tamarisk is, for a brief interval, eclipsed by mangoes, and other trees of garden growth. If there were a good practicable road from Sonmiáni to Kalát, it could be entered at any time by land from Karáchi without any material difficulty.

To return for an instant to Captain Outram. On arrival at Karáchi he was well received by Sett Nao Mull, a Hindu merchant of repute, of late years rewarded for his good offices to the British Government by admission to the Companionship of the Star of India. Provided by the same attentive host with a boat, he proceeded on board with his Afghan pony, of which he relates that, although not more than 13 hands in height, it had carried himself and saddle-bags, "weighing" altogether upwards of 16 stone, the whole distance from Kalát in "seven days and a half (an average of nearly 47 miles per day), "during which time he had passed 111 hours on its back." His appearance on arrival at Karáchi is thus described:—"A small *pagri* (native turban) composed of a twist about as thick as a finger "sparsely bound about his head, the hair cropping through the "interstices; white native tunic and trousers; native slippers; all "very dirty and mean looking. There was no saddle on the pony, "merely a cloth over his back." From Karáchi he embarked, on the evening of November 24th, for Bombay. Not many days after arrival there, he learnt that, at midnight, on the date of his departure from Sonmiani, the son of Wali Muhammad Khan, Chief of Wadd, killed at the siege of Kalát, had reached that port from the interior, in pursuit of him, expressing much disappointment and irritation at missing his intended prey.

Colonel Sir WILLIAM MEREWETHER, K.C.S.I., C.B.: As I happened to have been present in some parts of this country, I may perhaps be able to throw a little additional light upon the subject, and I therefore venture to say a few words in continuation of the lecture by my friend, Sir F. Goldsmid. There is not the least doubt that with the aid of modern science and the appliances we can bring to bear through our military schools, the road from Sonmiani to Kelat might be made perfectly practicable. As for the "Baranlak," or Baran Pass, I am certain (I have never been there, but I have had it described to me by a number of people) that it is not nearly so bad as the Devil's Staircase, as it was called, that we went through in Abyssinia, which in six weeks was made by two companies of Sappers practicable, not only for field guns but for heavy artillery, and Baranlak might be made equally so. The difficulty of the route is in the matter of supplies. Sir Richard Temple inquired into the subject, and he will bear me out when I say that from Sonmiani to Kelat, except at Baila, there are scarcely any towns or bazaars where supplies can be obtained. It would be necessary, therefore, if troops were sent in that direction, to place beforehand supplies at the different halting places. Then there is another point that ought always to be borne in mind, that if we had not possession of Scinde, if we had possession of Beluchistan only, it would perhaps be advisable to utilize that route; but having possession of Scinde, having a railway that extends from Karachi up to Sukkur, and having also the river Indus with a fleet of steamers upon it to carry our heavy material, I think it is scarcely necessary to devote much time or expense in forming a road from Sonmiani to Kelat. In addition to the railroad I have mentioned, we have the further advantage of that portion of railway which, through the energy and the active support given to it by our Chairman, we have recently heard has been completed from Sukkur to Sibi, to within 96 miles of the plateau of Southern Afghanistan; up to that point it is carried on the broad gauge, and I confess I should be happy to hear that the plans and estimates, when sent in, had

not shown such a fearful array of figures as to prevent its being carried on the same gauge the whole way to Candahar. The railway must have great military as well as political and commercial importance, therefore it would be an immense advantage that the line connecting Candahar with the Indus valley should be of the same gauge as that which connects the Indus valley with Calcutta and Karachi. Be that as it may, it is of the utmost importance that this railway communication should be carried out, and if it cannot be taken on the broad gauge, I believe it is proposed that the narrow gauge should be substituted from Sukkur. Having that railway communication, and having also water communication to Sukkur, we must necessarily be able to carry our military stores and troops with far greater facility and speed by that route than by the land route from Sonmiani to Kelat and Quetta. From Sonmiani to Kelat is, I believe, about 354 miles; and from that again there is the additional distance on to Quetta. The whole of the route is through hilly country. Except in some narrow valleys, there is scarcely a bit of plain ground; it is all sand and stone, and when you have to move troops the advantages of iron will be preferred to sand and stone.

Colonel MALCOLM GREEN, C.B.: I can testify that the part between Nal (where I was for some time stationed) and Quetta is perfectly passable, there being no obstruction.

Sir RICHARD TEMPLE: I may perhaps be permitted to corroborate what has fallen from Sir William Merewether. The importance which, in the days of Pottinger and before the annexation of Scinde, attached to the line which has been described in the lecture has of late considerably diminished, for precisely the reasons that have been so well stated by Sir William Merewether. In the days when Karachi was a little fishing village, hardly known beyond its immediate neighbourhood, Sonmiani was a tolerably flourishing sea-port. Now Karachi, as we all know, instead of being a fishing village, has become a great sea-port, a flourishing town, an important military station, and a place of considerable wealth, with a trade of between three and four millions sterling annually, and a population of hardly less than thirty or forty thousand souls. Such is the result of a single generation of British rule. Sonmiani, on the other hand, has been entirely snuffed out by the rise of Karachi. I visited Sonmiani just fourteen months ago, and stayed there two days, and a more miserable place you can hardly imagine. It was always rather wretched in its best days; now it is miserable in the extreme. Its trade has been almost extinguished. The caravans that used to come there from the central plateau of Beluchistan now take straight routes down to Karachi. The drinking-water of the place is extremely brackish, and can scarcely be drunk safely except by those who are acclimatized. The approaches to the place from the sea are too detestable to be described. The Government steamer which carried me had to lie far off upon the horizon, and it took us the greater part of the day to get from the steamer to the shore: we were floating about amid sandbanks and the like all day. So that except for the fishing, which is still very considerable and important, Sonmiani is a place which is to be numbered with the dead and the past. As regards the country near it, there are considerable means of development. There is a tolerably extensive plain between Sonmiani and the nearest hills, Lyari, and if the rains of the season have been abundant there are extensive lakes, with splendid pea-fowl shooting, and the like, and all around there is a considerable amount of tamarisk jungle suited for breeding camels, so that it may be called a fine camel-breeding country. Then with regard to the military route I may explain that since the days of Outram, within the last very few years, the route has been traversed by the political authorities of Kelat. Major (now Sir Robert) Sandiman passed that way upon political duty with, I think almost an entire regiment of Scinde horse, and the records of that march and of other marches are to be found in the annals of the Quartermaster-General's Department of Bombay. And recently we sent a considerable convoy of camels and stores from Sonmiani for the assistance of the forces under General Stewart operating upon Candahar. As some attention was at the time drawn to the experiment, I ought to explain to this strictly professional gathering of military men that the expedition was not undertaken for any military purpose, but merely for providing transport. We never dreamed of sending troops by that way, or even supplies. Our line of British communication is by

the Indus, and not at all by this back route through Southern Beluchistan. The fact was, we were seeking for camels; we had furnished 20,000 camels for the invasion of Southern Afghanistan, and the supply being nearly exhausted, it became necessary to send about 15,000 more, or some other means of transport equivalent to what may be called 15,000 camel-power. So that you can readily imagine that rich as Scinde is in camels, a draught of 20,000 exhausted it, and another draught following of 15,000, was a serious matter, and it compelled me and my Officers to look out for camels in every direction. We got some from the Rajputana country, some from the Scinde desert, some from all quarters of the compass. We heard great stories of this camel-breeding country of Sonmiani to which I have referred; we consequently attempted to get about 3,000 camels from the country near the sea-shore, and having got them we thought it better to march them straight up by the route described by Sir F. Goldsmid, to Kelat and thence to Quetta. You will see that it was a saving of distance. We might possibly have sent them across to Karachi, and round to Sukkur, and so on to Quetta; but it was easier to march them straight up, particularly as the other route was excessively crowded with traffic of every kind. There was no political or military significance attachable to our proceedings. Of course we did not forget that the exploration of military and political routes is always more or less desirable, and that any additional knowledge that could be obtained in this manner was so far to the good; but that was really quite secondary. Our primary object was to get at the shortest means of sending 3,000 or 4,000 camels up to Quetta. As regards Baila, that is a place of some importance politically. It is separated from Scinde by several ranges of mountains, not marked on the map. The route is of considerable interest, and the opening and frequenting of it does tend to the better political control of the interior of the Kelat territory. Then I might remark on the great importance politically of some of the other places mentioned in the lecture. The straight route from Ghuzni to Kelat, avoiding Candahar and the valley of Pishin, is of some political value; it is important for British interests that it should be opened up and developed. When Outram, in 1854, wrote his paper about the importance of the route which leads from the Gomal Valley to Daira Ismail Khan, he perhaps little thought of the interest which would attach to it in the future. If there is to be anything like a "scientific frontier" established down the line of the Indus, no doubt the Gomal route will have to be considered much more than it has been. People have been too apt to think that there are only two routes from Afghanistan to India, the old Khyber and the old Bolan. Would they be surprised to hear that there is an intermediate one which, in former invasions of India, has played an important part? Probably the route by which Muhmood of Ghuzni, the first Mahometan invader, approached India, was that touched upon in Sir F. Goldsmid's lecture. As regards the upper portion of the map, the district of Bamian, that is one of the most important in the whole land of Hindu Kush, or the Indian Caucasus. It has been of the first military and strategic importance from the days of Alexander the Great. It was passed and repassed by that great conqueror; and the carvings on that wonderful wall of rock by the Buddhists attest the importance which in mediæval centuries was attached by all nations to its possession. In any future arrangements that may be made between Russia and England in Central Asia, the possession of Bamian will have to be very carefully considered. I know not how far the name may be familiar to the ladies and gentlemen present, but it has always been a place of importance, and, if not in our lifetime, in the lifetime of those who come after us, it will play a prominent part in the general political arrangements of Asia. So that notwithstanding General Goldsmid, with characteristic modesty, rather deprecates any great interest being attached to the country he has been describing, I can assure you, after making all abatements for the political decadence of Southern Beluchistan, that the route which you have been invited to travel over in imagination comprises a country of the greatest interest and political importance. I will now ask you to accord by acclamation a vote of thanks to Sir F. Goldsmid for his interesting lecture.

Wednesday, June 23, 1880.

LIEUT.-GENERAL SIR GARNET J. WOLSELEY, G.C.B., G.C.M.G.,
&c., &c., in the Chair.

A TRANSPORT SERVICE FOR ASIATIC WARFARE,
WITH A BRIEF ACCOUNT OF THE TRANSPORT
OPERATIONS FROM SUKKUR TO QUETTA IN 1879.

By LIEUTENANT D. C. DEAN-PITT, R.A.

I PROPOSE first to give an account of those transport operations which I had the good fortune to see while serving with General Phayre, from January to August 1879, which operations were carried on between Sukkur and Quetta. And I may here say that I am indebted to Sir R. Temple for some facts and figures, as he has been kind enough to place some of his minutes at my disposal, and from which I propose to read two extracts during the course of this paper.

I am also much indebted to Lieutenant Forster, 15th Regiment, who has kindly refreshed my memory on many points. He was most intimately connected with the transport, having been personal assistant to the Director. Lieutenant Pogson, 15th Regiment, who was a Transport Officer, has also furnished me with much valuable information.

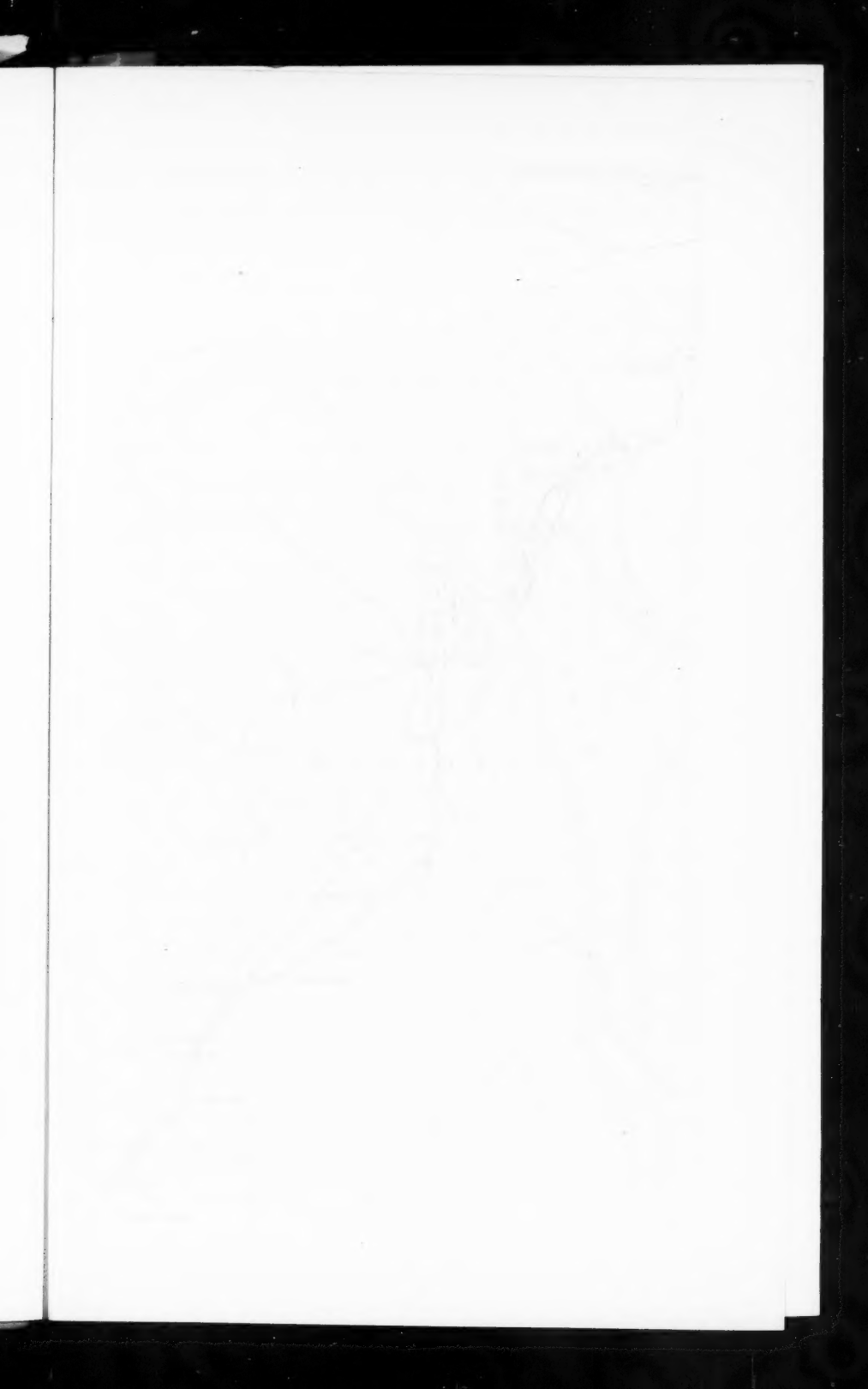
In January 1879 the position of affairs with regard to our transport and the line of communication between Sukkur and Quetta was somewhat as follows:—

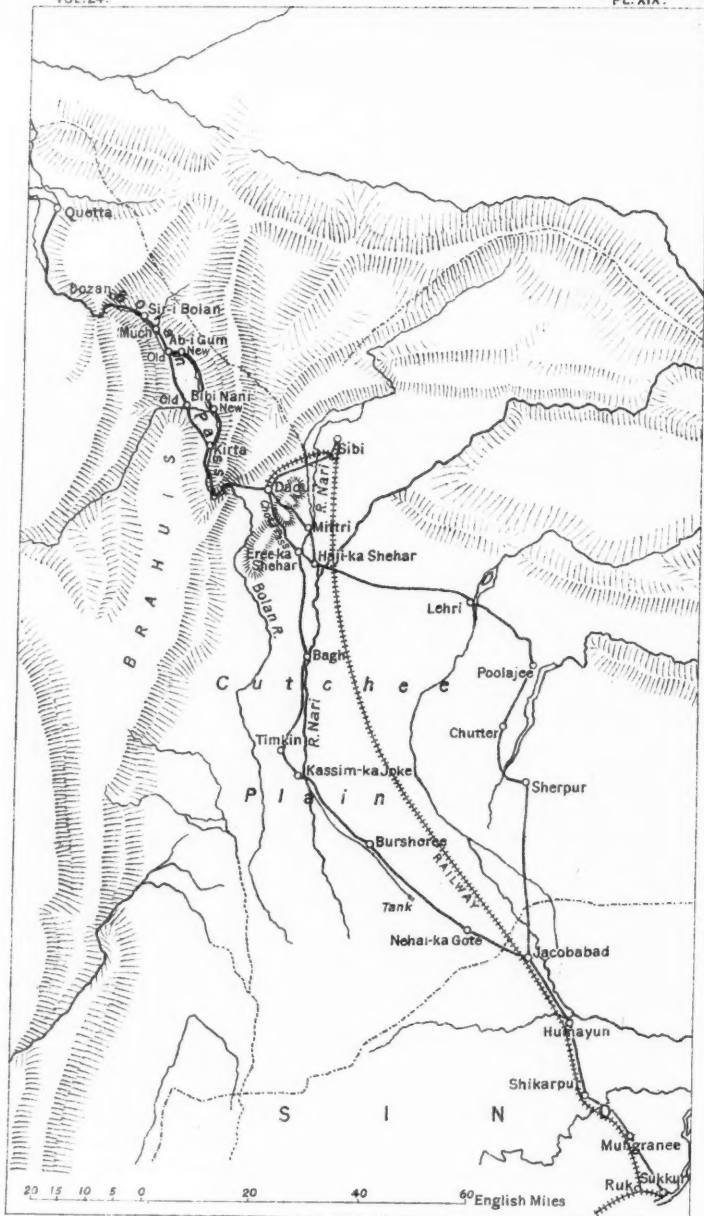
General Sir Donald Stewart had been in possession of Kandahar for four or five weeks. The road between Quetta and Kandahar was secured by various posts. There was a garrison at Quetta, a few stations in the Bolan with small guards, and a large Transport and Commissariat Depôt at Dadur, which, as you see, is just at the entrance of the Bolan Pass, some $3\frac{1}{2}$ miles from the mouth. Then, a small daily transport train composed of hired carriage was working from Sukkur to Dadur, *viâ* the Sherpur and Lehri route; there were small guards at each station, and at Lehri and Poolajee, detachments of Sind Horse were posted. At Sibi, which by the Treaty of Gundamuck became part of the assigned districts, there was a strong detachment of infantry.

General Phayre's brigade, with two companies of sappers and miners, was near Jacobabad and Sukkur.

The three batteries of a very complete siege train were also on the road. The 25-pounder battery had reached Dadur; the 40-pounder battery, with the head-quarters of the train, was at Jacobabad, and the howitzer unit or battery was at Sukkur.

The daily train I have just spoken of had, from the badness of the





road and sickness among bullocks, &c., fallen to a low ebb, and the daily flow fell far short of what was intended and what was necessary, the consequence being a block of stores at Jacobabad, at Sherpur, and afterwards at Lehri.

As regards the state of the road, or I should say "way," for no road existed from Jacobabad to Quetta, no good thing can be said. From Sukkur to Jacobabad, a distance of 50 miles, the road was excellent, that is, as good a road as you could possibly have in a country where there are no stones. It was, and is still, a grass road, and except in wet weather, it presents no difficulty to traffic, and the watercourses and canals are well bridged.

From Jacobabad onwards to Dadur the way lay over the flat Cutchee plain, across sandy wastes and arid deserts, long distances had to be traversed without water, and the road was in nearly all places exceedingly heavy, especially between Jacobabad and Sherpur, and between Poolajee and Lehri. The march from Lehri to Mittri was a very trying one, though it was on fairly hard ground, but it was 28 miles in length, and at the end of it the broad bed of the River Nari had to be crossed. If any officer of artillery who marched by the Sherpur and Lehri route be here, I am sure he will be able to speak feelingly about his journey. It was trying for men, animals, and carriages.

The road up the Bolan was as it was in the time of Sir William Nott and Sir Richard England. The same boulders, the same deep almost bottomless shingle, the same numberless river crossings, which rendered the first two marches so trying to men and animals. Carts could not be used in the Bolan, and the artillery marching up encountered many troubles, especially the heavy batteries; not less were the difficulties of the ordnance and engineer parks. I well remember the first time I went up the Bolan, that between Bibi Nani and Much I came across a pontoon complete, on its carriage, hopelessly stuck, and left there, a silent but eloquent witness to the difficulties our army had to encounter on its march through this celebrated pass.

This, then, gentlemen, was the state of affairs as regards transport and the line of communication in January 1879. It was in this month that, to relieve the block at Jacobabad, contracts were entered into for the conveyance of a portion of the stores to Dadur. Camel owners and cart owners were more willing to serve contractors than they were to serve Government, they knew there was no chance of their being forced up into the dreaded regions beyond Dadur, as was believed to have been the case in the earlier part of the campaign; this feeling of repugnance to go up into the passes was increased tenfold by the tales of hardship and privation which had been brought back by those followers who had been fortunate enough to have already returned.

The coming forward of these contractors afforded a very acceptable relief to the block at Jacobabad, and they were found to fulfil their contracts with regularity and honesty; and though at first they only carried a small proportion of what had to be conveyed, still every 1,000 maunds removed made a difference. Since I shall make use of the expression "maund" more than once, I may state, for the benefit of

those to whom the expression is not familiar, that a maund is 80 lbs., so that 28 maunds is equal to a ton.

It was in January that the Government of India placed the control of the line of communication from Sukkur to Quetta under General Phayre, and late in the same month ordered 300,000 maunds of food-supplies to be conveyed from the base to Dadur and Quetta before the 1st of May. In addition to this, all ordnance stores, commissariat stores, clothing, &c., which were on the line, had to be carried. An engineer park was at Sukkur awaiting carriage to enable it to move up, carriage to convey the siege train to Quetta had to be provided; troops in small bodies, which at intervals moved up to the front, had to be given transport; and, lastly, some 10,000,000 rupees had to be carried and escorted to Quetta.

As you may well imagine, to do this work, a large and efficient transport service was necessary, and the organization and control of this transport was also placed in the hands of General Phayre.

In this month (January), the Brahui camels first began to work with any regularity from Dadur to Quetta. This expression "Brahui camel" needs some explanation. The Brahuīs are a tribe who, during the warm season, inhabit the highlands of Beloochistan, and during the cold season graze their flocks and herds in certain parts of the Cutchee Plain. These people possess a large number of very excellent hill camels capable of carrying heavy loads and working in hilly country. The Brahuīs at first were very averse to taking service under Government or working with troops, but at last they agreed to enter into contracts to carry stores (and then only stores which were not liable to break or damage, such as grain, &c.) from Dadur to Quetta. From this time to early in May they worked very regularly, carrying some 25,000 maunds a month to Quetta. These people required great tact in dealing with them, and very gentle handling.

The then existing hired transport which I have before referred to being quite inadequate to meet the great requirements thus suddenly put on it, it was decided to organize a transport service, of which the animals should be the property of Government, and the civil authorities began at once to collect this carriage, and the remnants of the old hired transport train were to be discharged as soon as the new train was in working order.

Sind had already supplied 20,000 camels, which had gone above the passes with the advanced force, so there was no great abundance of them in the country; 10,000, however, were ordered to be bought, of which 3,000 were to come from the province of Rajputana, and which in due course arrived; of the remaining 7,000, however, General Phayre's transport service was never able to utilize more than four or five thousand, the others having been used for other purposes.

Two thousand four hundred carts were ordered to be made up with all dispatch in Bombay, and sent up to Sukkur, the 5,000 bullocks for them being purchased in Sind without any difficulty. An order was also given for the purchase of a large number of ponies and donkeys, with as many mules as could be got; but there is no great supply of this last-named animal in India, a fact much to be

deplored. I believe steps are now being taken to breed these animals in considerable numbers.

I may say now that these ponies, donkeys, &c., never did very much for the transport service below Quetta; many were sent on to the front as soon as equipped, and there was considerable delay in the equipment of all of them.

Of course all this carriage did not come in at once, but the organization was begun by General Phayre without delay.

There were a certain number of transport officers belonging to the old train who formed the nucleus of the new service. An officer of high rank and known ability took charge of the base at Sukkur and submitted a scheme for the organization of the train, and which, with some modifications, was accepted by the Brigadier-General.

Risking the charge of being unconnected in my discourse, I must now, gentlemen, before proceeding with an account of the organization of the train, tell you that General Phayre, in conjunction with Sir Richard Temple, the then Governor of Bombay, had decided on removing the line of road from the old way, *viâ* Lehri, &c., to a new line *viâ* Burshooree, Bagh, &c.

The advantages of this new line were many; there was only one long desert march in it, namely, from Nehal-ka-Gote to Burshooree—instead of the two on the old line; the River Nari was crossed at a much more easy spot than at Mitree—and the road from Kassim-ka-Joke, where this crossing is, followed more or less the right bank of the Nari, being well supplied with water. Between Eree-ka-Sher and Dadur, the road had to cross over a low range of hills, through a pass some 3 miles long, known as the Chota or Little Bolan. General Phayre determined to make a good road along the whole of this route from Jacobabad to Dadur, and to bridge the watercourses so as to admit of the heavy ordnance crossing without difficulty. Along this new line all the stores then at Jacobabad and Sukkur, and all that had yet to arrive, were to pass, and such was eventually the case. The 19th Bombay Native Infantry, and two companies of the Bombay Sappers and Miners, made a large portion of this road; the rest was made by local labour obtained by the Executive Engineer of the District. The difficult part through the Chota Bolan was made entirely by our troops. I must not, however, be led into giving you an account of all our road-making, as if I once began to relate all that was done in that way in the Bolan itself, I should occupy far too much time, besides digressing from the subject of the Paper. Suffice it to say, that in the middle of February the road from Jacobabad to Dadur was open for wheeled traffic; and before the 1st of May the siege train had marched up to Quetta—without difficulty, the whole of the work in the Bolan having been done by the troops of the brigade.

Nothing more was now sent by the old route *viâ* Sherpur and Lehri, the remnants of the old train which still existed on it were kept until the block at Sherpur and Poolagee was cleared off, and the stores on this road were not finally cleared up to Dadur until the middle of March.

Now to return to the scheme for the organization of the new transport service. It was decided that the staging system should be adopted; that from Sukkur to Jacobabad the 2,400 carts should work, and that the camels should work onwards from Jacobabad to Dadur. Until, however, complete staging arrangements had been made, the staging camps established, &c., the camels, as they arrived at the base, Sukkur, were to be sent on in convoys of 300 or 400 to Dadur, and as they returned, posted at the various stages. It was proposed that the animals should be so posted that a daily train of 500 camels should arrive at Dadur, each camel carrying four maunds, or 320 lbs. This would mean a flow into Dadur of 60,000 maunds a-month, carried entirely by Government carriage. A train of 500 camels daily was, as a matter of fact, never reached; I do not think it ever exceeded 300 camels a-day. The cart-train was to put between 250 and 300 cart-loads a-day into Jacobabad—this meant some 80,000 or 90,000 maunds a-month, a quantity, as you will see, very much in excess of what was to flow monthly out of Jacobabad towards Dadur. It was expected that this excess would be carried by contractors, and such proved to be the case.

As you can well imagine, the arrangements for keeping and watering so many animals at these newly established camps between Jacobabad and Dadur required some little organization. The country around had to be tapped for forage, and the Commissariat was heavily worked. At each camp—and these were, Jacobabad, Nehal-ka-Gote, Burshooree, Kassim-ka-Joke, Bagh, Hadji-ka-Shah—there had to be double as many camels as there were in the daily train, as of course each day one-half were performing the return journey.

At Nehal-ka-Gote, however, from which camp the long desert march began, there was a double allowance of camels to allow a day's rest after the long march, both going and returning. I may here say that in the course of the next few months, a watercourse was dug from Burshooree to a point in the centre of this long desert march, a tank dug there and filled. The country having a fall of 30 feet in 12 miles permitted of this. The supply of water was not very great, nor was it regular, as it depended on the height of the Nari river; but even as it was, it proved a great boon.

The line between Sukkur and Dadur, which was 159 miles long, was divided into three divisions, viz., Sukkur to Jacobabad, Jacobabad to Kassim-ka-Joke, and from Kassim to Dadur. The Director of Transport at Sukkur had immediate charge of the first division. A Superintendent of Transport had charge of the second, and another Superintendent of the third.

At Dadur, the Director of Transport, who had been in charge of the old train, was stationed, and it was his duty to arrange for the onward transit of stores by the Brahui camels. On the arrival of the stores at Dadur they went into commissariat charge and were re-handed over to transport charge according as the Director of Transport had carriage for them.

At each staging camp, with two exceptions, there was an Assistant Superintendent of Transport. The two camps which were without a

commissioned officer were, if I remember rightly, Mungranee and Humayon, which, as you see, are 12 and 38 miles respectively from Sukkur.

At Sukkur, the transport staff consisted of the Director, the Assistant to the Director, who performed the duties of Quartermaster, and an Assistant Superintendent as the executive Transport Officer.

The office establishment at Sukkur consisted of six clerks, and in the Quartermaster's office, one head storekeeper and two 2nd class storekeepers.

Each Assistant Superintendent in charge of a stage was allowed a writer to help him in his office work, of which he had a good deal, since he was entrusted with the payment of all the men under him. And, curiously enough, instead of having to forward his accounts to the Head Transport Office at Sukkur, he had to send them direct to the Left Field Office at Umballa. Why this plan was adopted I am quite unable to say, but it was not a satisfactory one. Confusion often arose when reference was made on any point from the Field Office at Umballa to the Head Transport Office at Sukkur. When, however, the train moved up the Bolan, as it eventually did, a pay office was established and an officer appointed paymaster of the train, and all payments were made through him. This plan was found to work very satisfactorily.

A sort of military police, consisting of 4 non-commissioned officers and 20 sepoy, was established and employed at the stages between Sukkur and Jacobabad. They prevented much petty pilfering that had been going on before they were employed, and were the means of recovering a good deal of property which had been stolen. They were also useful in keeping a look-out on the transport followers, seeing they did their work properly, and so on.

The following are the scales of establishments for the various animals:—

For bullocks—

- 1 driver for each pair.
- 1 1st class inspector for 100 drivers.
- 2 2nd " " "
- 2 Head Muccudums "
- 4 2nd " " "
- 1 native doctor for every 500 animals.

For camels—

- 1 driver for 4 camels.
 - 1 Jemedar for 50 "
 - 2 native doctors for 500 camels.
 - 1 1st class inspector
 - 1 2nd " " "
 - 3 Head Muccudums
 - 6 2nd " " "
- } For every 100 drivers.

For mules and ponies—

- 1 driver for every 3.
- 1 Muccudum for every 50.

For donkeys—

1 driver for every 6.

1 Muccudum for every 50.

The rates of pay were as follows—

1st class inspector	75	rupees per mensem.
2nd „ „	60	„ „
Head Muccudum	25	„ „
Second „ „	15	„ „
Cartman (without rations)	10	„ „
„ (with rations)	8	„ „

About forty carpenters and blacksmiths were employed between Sukkur and Jacobabad keeping the carts in repair.

It was towards the end of February that carts and camels began to work regularly by stages, the arrangements for feeding and watering at the various staging camps having been completed, and grass sheds erected at all of them to accommodate the officer, offices, &c.

I would call your attention to the fact that this organization was going on while transport work was being done, which naturally added to the difficulties; and the proposed plan of organization was never quite completed as regards the complement of men and animals, owing to a certain amount of desertion and sickness. Much difficulty was experienced at first, owing to the inexperience of many of the men engaged as bullock-drivers and as camel-men. Another point of difficulty was the inefficiency of many of the inspectors. We were unable then to employ soldiers for this work, and some of them were unable to keep the men under their charge in order. All these things threw very heavy work indeed on the Transport Officers.

The daily train, when established, had to march with but two sowars as an escort, with one camel sowar and a second-class Inspector in charge; and as camels straggle very much, this almost amounted to no escort.

At each staging camp, the small infantry guards gave great assistance to the Transport Officers in charge, especially as regards the sanitary arrangements of the camp. The train was thus working in fair order and every nerve was being strained to get the work completed in time.

About the 23rd of February, it was decided by the Government of India that the garrison batteries, with the siege train, were to return to India, an officer and 10 European men only being left in charge of each unit, the staff officer of the siege train, Major Noble, R.A., remaining in charge of the whole. The train was to be got up to Quetta as soon as possible, and there parked. By the 13th or 14th of March, the two units of the train which were respectively at Jacobabad and Sukkur, had arrived at Dadur, having marched up the new road without difficulty, and they now only waited the completion of the road through the Bolan, to go to Quetta.

This road was begun early in February, and two companies of sappers, with the 19th Native Infantry, moved well into the pass the last week of that month to continue the arduous work. The road,

which took an entirely new line from Kirta, was complete to Much by the end of March, and, as I have before mentioned, the siege train arrived in Quetta before May 1st.

The engineer park from Sukkur arrived at Dadur also about the end of February, and at Quetta in April. It required something like 400 camels as carriage.

The stores which were now thrown daily into Dadur by our train and by the contract convoys exceeded very considerably what was sent on by the Brahui camels. This, of course, had been expected and intended, the plan being, when the total quantity of stores had been carried to Dadur, to bring up the carriage and sweep the block from Dadur on to Quetta.

To relieve, however, to a slight extent the block at Dadur, and at the same time to store the pass, or, I should say, one of the higher stations in the pass, in anticipation of the brigade and the transport summering there, a few carts, some 120, were sent forward from the base, to work in the pass as far as the road was completed.

The ammunition carts of the siege train, which were very strong and capacious, and which had most excellent teams of bullocks, were also brought into use for this duty; and while the train was halting at Dadur, these carts made some three trips to Much, taking over 3,000 maunds of stores.

At the end of March, it was reported that Sukkur would be clear of food supplies and stores very early in April. This would give the total amount of food carried from the 1st of January to be 200,000 maunds, of which but a very small proportion had been carried in January.

On the fact of Sukkur being nearly empty being reported to headquarters, the commissariat authorities stated that they considered that what had been carried was quite sufficient for the then reduced force in Southern Afghanistan. This was good news for all concerned with the transport, as it meant that the line would be quite clear from Sukkur to Dadur by the 20th of April, if not earlier; then all the carriage would be transferred to Dadur, to work on to Quetta. It was important that all Europeans should be got out of the Cutchee plains as soon as possible. The heat was beginning to be severe, and the incessant strain on men and animals was beginning to tell. The Government of India, however, dashed all the newly formed hopes to the ground, by ordering 100,000 maunds of food supplies to be thrown at once into Sukkur, for immediate conveyance to the front. Transport officers and men had to make up their minds to a few weeks more of Cutchee heat.

At this time, as if to add to the difficulties, an order was received to send 1,700 good camels, and 2,000 mules and ponies, to the front. The camel train was thus considerably reduced. The ponies and mules had just been equipped and would have given a certain amount of help; of course most of these animals were sent on loaded, but some were not, so as to ensure them arriving in as good condition as possible. More than 700 of the camels sent up were employed in carrying treasure.

The additional 100,000 maunds which I have just spoken of were eventually reduced to 50,000; but even with this reduction, the line from Sukkur to Dadur was not finally cleared up until close on the 20th of May.

By this time the camels of the train had become comparatively few in number; the mortality during the last few weeks had been very great, owing to the continued work and excessive heat; nearly all the good camels had been or were being sent forward to the front, so that nothing remained but between 2,000 and 3,000 sick and sore-backed animals. It was decided that these were to be sent back to graze in the district around Jacobabad, so as to recover strength and condition for work in the ensuing cold weather. The march back of these sick camels was a remarkable one, as it shows how camels die off when exposed to severe heat and continued work. A native officer of cavalry, with a party of sowars, started from the neighbourhood of Dadur with about 1,800 *unloaded* camels; he arrived in a week or six days at Jacobabad, with something under 1,200, the balance having just died on the road.

The large block of stores which was at Dadur early in May was to be worked up the pass by carts, the ponies, and mules, and donkeys which we still had.

At the end of May, Dadur was clear of all that had to be carried, a large amount of ordnance and commissariat stores being left there, a native officer and some 60 or 70 sepoy remaining as a guard. The transport offices, carts, and bullocks were then moved up the pass.

Some 1,800 ponies and mules, with a large number of donkeys also, were, however, still at Dadur and Eree-ka-Sher, which last place you see is some 15 or 16 miles from Dadur, on the Jacobabad road. They were on the point of starting up the pass, when cholera broke out among the followers at both places, also in the town of Dadur.

The officer in charge determined not to move up the pass for fear of the disease spreading among the bulk of the transport followers and the brigade, which were now at Dozan and Much. Medical aid was sent from Quetta and Jacobabad as soon as possible, and some officers went down to assist the one transport officer who was in charge of these ponies, &c. At Eree-ka-Sher there was a Commissariat Officer who had been up the line on duty and was returning to Sukkur.

It is not my intention to give here a detailed account of the horrors of that epidemic. Suffice it to say, that there was more unselfish devotion shown by European officers and warrant officers during that time, than is in my power to describe. The Commissariat Officer whom I have just mentioned delayed his return when the cholera appeared, and was alone at first, afterwards with one medical subordinate to assist him, he attended those struck down by this fell disease as if they had been his brothers; night and day he sat by the side of the sick, ministering to their wants; able only at long intervals to snatch a few minutes of that repose so greatly needed, so hardly earned. And remember! that his work was not in the well-ventilated, well-arranged wards of a hospital, but in rudely constructed grass sheds, exposed to the burning and, I may say, almost deadly heat of

June in the Cutchee Plain. Not until the disease had been got fairly under, and those who survived had joined the rest of the train at Dadur, did he leave his post. Gentlemen, this officer was Lieutenant-Colonel Shewell, of the Bombay Commissariat.

Similar scenes had been enacted at Dadur. Equal devotion and attention had been shown there. The mortality had been very great; the postal and telegraph officials died in one night. The town of Dadur suffered severely. One Commissariat Warrant Officer, who had rendered himself conspicuous by his cheerful and unremitting aid to the sick, himself fell a victim, but not until the cholera had been nearly stamped out; he lived to see his efforts crowned with success and then, brave man, succumbed to that disease with which he had combated so long and so well.

Though great precautions had been taken, isolated cases occurred in the pass, and some of the sepoys of the 1st Grenadiers, 19th Native Infantry, and Sappers and Miners died—but very few. As I have before said, convoys of carts, the camels transferred to the front, and the Brahui contractors, had successfully cleared Dadur of what had to be carried by the end of May.

Thus early in June the whole of our transport, except the sick camels, was located in the pass. A large repairing dépôt was established at Much, so as to get the carts and gear into order. Various grazing camps were established for the bullocks, which had become somewhat low in condition after the hard work they had done, and many of them were very footsore. Some of these camps were near Dozan, some near Sir-i-Bolan. The camps had to be selected so as to ensure good grazing close by and a good water supply. Sometimes the water had to be brought by aqueducts; one especially we looked on as a great triumph. It was a masonry aqueduct of more than a mile in length, from Dozan down to the Bolan. Some watercourses that were made exceeded this in length, notably one leading from the Bolan river to New Abigum, which you see on the map.

It had often been stated that there was no subsistence for animals in the Bolan; the fallacy of this statement was proved by the fact that all these animals, numbering considerably over 4,000, were grazed there during the summer months; and very large supplies of forage were cut and stacked for future use in the winter.

I have just spoken of the repairing dépôt at Much. The carts were in great need of repair. The 2,400 carts which had been supplied from Bombay were thoroughly good, strong, and well seasoned, but the very best cart ever turned out of a workshop would be unable to withstand successfully the burning blasts of the Cutchee Plain during April and May. Everything that was possible had been done to keep them in good order; grass had been bound round the naves and spokes, and when possible kept moist; but the train was continually working, and despite all precautions, spokes would get loose, felloes crack, and then some sudden jolt would cause a complete collapse.

All the remnants were collected at Much, and from these remnants serviceable carts were put together.

In June, some cart roads having been opened out beyond Quetta, an

order was received to transfer 500 carts with 1,000 bullocks to the transport authorities there. This was speedily done, as it gave considerable relief to the resources of the pass.

I have now almost concluded the account of those transport operations which it was my lot to witness.

The work that had been ordered, had been done, and done successfully.

That there was a considerable mortality among the animals, and much wear and tear of material, is certainly the case, but I affirm that it would have been beyond human power to have prevented it. Incessant and hard work in the summer months in a climate like that of Upper Sind can have but one result.

Camels, in my opinion—and I do but echo that of many far more experienced than myself—cannot really thrive unless regularly grazed; and to graze camels working in daily stages would, with grazing close at hand, be very difficult; and when the grazing is at a distance, it becomes an impossibility. Of course grazing when working in a hostile country is not practicable. The following are a few lines from a Minute written by Sir Richard Temple, in which, speaking of the superiority of cart over camel carriage, he says:—

“It is often astonishing to see what a small number of sappers can do in making cross-country lines passable for carts of a military transport train. Hard and costly experience teaches us that, however valuable some camels may be for commercial caravans, the Indian camels are unsuited for military transport in Afghanistan. The loss of these camels by death in vast numbers is a cause of grave military risk.”

This is the opinion of one whose experience in transport matters is as lengthened as it is varied.

The main points to which I would wish to draw your attention, with reference to the foregoing remarks, are these:—

First. That this transport service was entirely independent of commissariat control, being solely under General Phayre. That the Commissariat Department was not intimately connected with it, I do not for a moment say. They had hard and often difficult work, and always did it well; but they had nothing whatever to do with the organization and working of the train.

Second. That the work was carried on for a long time in the summer months, a feat of which any transport service might be proud. The severe blow which the train received by the outbreak of cholera is much to be lamented, but it would have been tenfold more disastrous if it had occurred before the bulk of the transport had moved up the pass; as it was, we lost over 300 followers, and a small proportion of non-commissioned officers and sepoys.

The *third* point is, that the service was carried on entirely by Government animals and by contractors. No hired transport was used. Contract carriage is very different to hired carriage, and it involves little or no trouble, and no anxiety as to providing for the animals and followers. While on the subject of hired transport, I do not think it out of place to read another extract from a Minute by Sir

Richard Temple, dated September 9, 1879, which bears directly on this subject. He says, "That the amount of transport required for active service, such as the late campaign in Afghanistan, is so great that to hire transport is synonymous to pressing it from the people of the district from which it is hired, and impressment of the means of transport must lead to impressment of drivers, who naturally (having no interest whatever in the campaign in which they are called upon to serve) render the most unwilling service, and take the earliest opportunity of rendering their animals unserviceable, in hopes of escaping a distasteful duty. This service is frequently so unpopular that, sooner than leave the boundaries of their native country, the impressed drivers desert, leaving their animals in the hands of the transport authorities, or take them away with them, if not supervised and guarded with the utmost care. Again, compensation must be given for animals hired in case of death or hurt. This very fact of compensation is in itself an inducement to owners to damage or even kill their animals, and this is a source of great expense to Government. The hire and consequent impressment of transport thus becomes a real hardship on the people of the country nearest to the seat of war, and the experience of the late campaign will doubtless show the immense difficulties of settling accounts for this sort of transport. For the above reasons I should recommend that all transport for a campaign be the property of Government. This will induce better care of the animals, which, if properly looked after, will, even in the face of great casualties, prove valuable property to Government at the end of a campaign. When transport on a large scale is really hired without impressment, if such be possible, which I doubt, we must take what we can get, whereas, if we purchase we can pick and choose, and supply willing attendants from other parts of India if necessary."

This, I may say, is the opinion of a recognized authority on the subject.

Before advancing some theories on the subject of a transport for Asiatic warfare, I may conclude the first part of my subject by pointing out to you how the face of the country through which these operations took place, has been and is being changed.

The dreary march of 159 miles from Sukkur to the foot of the hills at Dadur is now no more. You can journey comfortably from Ruk, which you see is just west of Sukkur, to Sibi in seven or eight hours by railway. The line is even now gradually but surely advancing into the Beloochistan hills, and ere long will reach the Quetta plateau. By this time two years, if the scheme is carried out, any one of you will be able to travel to Candahar in less than two days from Karachi or Mooltan, and when the railway reaches Candahar, that place becomes our base for any future operations in Central Asia, which may be undertaken for the sake of upholding the British Empire in the East.

I now turn to the second part of my paper.—A Transport Service for Asiatic warfare.

In the time at my disposal it will not be possible for me to go into minute details concerning the organization of such a service, I shall

only be able to speak generally; since in transport matters as in everything else, "circumstances alter cases."

It may, I think, be safely presumed, that in an Asiatic campaign, such as we may be engaged in, there would be no railways in the actual theatre of war, so in these remarks we start with the hypothesis that the base of our transport service is at that point where our railway system, or river communication, may end—as Sukkur was the base for our army in Southern Afghanistan in the campaign of 1878-79, and as Sibi became the base for that army when the railway had reached that point.

The transport service should be of two kinds: the transport service proper, and the corps or regimental transport service, and it is with the organization and working of these two kinds of transport that we have to deal.

First let us turn to the transport service proper, not the regimental one.

The duty of this service would be to convey all commissariat stores, ordnance stores, munitions of war, and material generally. This department should be under the control of the Director or Director-General of Transport, as the case might be. This officer should be in direct communication with the Commander of the forces, and above all things he should be entirely distinct from the commissariat department, and in no way under its control.

Some people advocate the transport being worked by the commissariat department, but for many reasons this is to be deprecated. This department is in time of war strained to its utmost, without having the management and organization of a transport service thrown on its shoulders; again, there is not a sufficiently military element in the organization of the commissariat to secure the efficiency of a transport service worked by it.

A transport service cannot be really efficient unless there is a very strong military element diffused throughout its composition. Why? Because in the first place transport followers, in whatever country they may be, are proverbially dragged from the dregs of the population, and to keep them in order, a tight hand, just and ready punishment, a constant supervision, and military regularity, are all required. In the second place, there is no service in which the chain of responsibility, which is the soul of military organization, is so necessary. Though, as departments, the commissariat and transport should be entirely separate, yet, as their work has to dovetail together, it should be the endeavour of every officer employed in either department to avoid those petty departmental frictions which are so common, and so fatal to efficiency.

The head of the commissariat department being in constant communication with the Commander of the force, would be thoroughly posted as to all movements of troops, and his arrangements would be made accordingly. The head of the transport department is in the same way kept informed as to how much his department will be required to carry, when and where the stores will be wanted, and when and where the said stores will be handed over to him for

transport. After receiving charge of these stores, the transport department would be alone responsible for their delivery at the specified places on the specified date. The responsibility of the supply of the various depôts along the line of communication would thus rest on the transport, provided of course that the stores were handed over to them in proper time. In short, the commissariat is to provide stores and supplies; the transport to carry them: two entirely independent operations.

The service is either carried out on the staging system, or by convoys. The former plan can hardly be adopted on the first advance of an army into a hostile country; where, however, the line of march traverses at first friendly countries it may be with safety adopted, such for instance as the 150 miles from Sukkur to Dadur. The staging system is very simple, and consists in establishing a certain number of animals or carts at each stage, half of which move to the stage to their front, each day, returning the next. The advantages of this system are, that the animals are more stationary, living as it were at two stages, and every other day on the return journey being without loads; that there is less difficulty in the regular feeding and watering of the animals; that they can be better supervised by the transport officers; that the gear is more easily kept in repair, there being establishments at each stage for the repair of harness; that the office work can be done better, and is attended with less difficulties; and that sick animals can be better looked after. These advantages are no slight ones.

When the distance between any two stages is exceptionally long, a third or even fourth relief of animals may be with advantage kept up.

The staging system is certainly less wearing to men and animals than the convoy system, and whenever possible should be adopted. The whole service is kept more compact, and each transport officer is less likely to be separated from his particular division or sub-division of the train.

If the line of march however is in an enemy's country, and open to attack, the service must be worked by large convoys accompanying at first the advance of the troops, and afterwards strongly escorted with such a strength of escort as the authorities may think advisable.

Before a campaign is actually begun, it should be clearly ascertained, either from the experience of former campaigns or from local knowledge, what is the best kind of transport carriage to adopt, what is most easily procurable, and what prospect there is of being able to obtain suitable grass or fodder along the lines of communication for the animals; as the transport of grass or hay along a line of communication for the supply of a whole transport service, in addition to the supply of the horses of the troops, adds such a burden to the department, that unless the line of communication be unusually short, it would be almost impossible to bear it. Every point along the line to which grass can be brought from the surrounding country should be stocked as soon as possible. In selecting transport the following points should be borne in mind: that, where they can be used, there is no carriage equal to cart carriage. That camels, though most

useful, are precarious carriage, unless suitable food and their natural forage is obtainable; that they are delicate animals, and at times the mortality from sickness becomes so severe, that it would cripple any transport service, however highly organized. That mules are recognized as the best and hardiest of all pack animals; especially are they valuable in a hilly country; they are however somewhat particular about the water they drink, and they are not very suitable for carrying long bulky parcels, such as a Sepoy's pal or tent.

That ponies are fair transport, but when they lose condition they are extremely liable to sore backs.

That bullocks are very excellent pack animals, having great patience and endurance. In rough and rocky country, however, they are extremely liable to become footsore, and require to be kept well shod. This last remark applies of course to ponies and mules as well.

The subject of pack saddles is a very difficult one. I am not sure that there is at present a thoroughly satisfactory one, but as a general rule, if the pack saddle of the country or district be used, of course strongly made up, no great mistake can be made.

The appointment of officers to the transport service is a subject that should receive great attention. At present the service is without doubt an unpopular one, and it is so for many obvious reasons, which, however, it is not my intention to discuss—suffice it to say that I think few men who had once been employed as transport officers, would care about being employed in the service again, if they could join in a campaign in any other way; of course for the sake of going on service most men will do anything. I should suggest that this service might be made more attractive. For it should be remembered that on its efficiency depends the efficiency of the army.

An army without a good and adequate transport service may remain hopelessly stranded at some point in the theatre of war, without either the means of advance or retreat, and possibly exposed to privation from the actual want of food. Can there be anything more likely to encourage and inspirit an enemy than to see their opponents in this plight? However superior in arms, physique, or discipline they may be, still they are crippled. To quote the words of Colonel Hamley in his "Operations of War," in speaking of what is necessary for the efficiency of an army—"Food, ammunition, clothing, medicine, and 'recruits must find free access to it, and the stream of these supplies must be unceasing.'" And this means that the transport service must be first rate. The question of giving a certain number of officers a transport-training in time of peace, will be discussed hereafter.

The commissioned officers of the transport service would consist of directors, superintendents, and assistant superintendents.

The Director-General or head of the service would be in constant communication with the Commander of the force, and with the head of the commissariat department. All orders to the directors should be through him, and except in a case of extreme emergency, no commanding officer (except of course the Commander of the force), whatever his rank, should be allowed to interfere in any way in the working of the service. Under each director of transport there

should be a number of superintendents of transport—officers of some standing and experience—their numbers of course depending on the size of the service; but one to every 2,000 animals or 1,000 carts would not be too many for efficiency, especially when it is considered that the actual office work of every transport officer, connected with the payment of followers and rationing both followers and animals, is very great.

Under each superintendent of transport there should be a certain number of officers styled assistant superintendents, under each of whom a certain proportion of the 2,000 animals or 1,000 carts would be placed, and these officers would be personally responsible to their superintendent for the correct supervision of those animals, &c., placed in their charge. Three assistant superintendents to each superintendent would be sufficient. These numbers give a proportion of four commissioned officers to every 2,000 animals, that is, one officer to 500 animals; this may be thought excessive and expensive; it certainly appears to be so; whether it would prove so in the long run is open to argument. Certain it is that the more officers with a transport service, the better looked after are the animals, which is the essential point of all transport service.

The directors would be in charge of very large divisions of the transport, and they should each have a complete staff consisting of a personal assistant, a paymaster and a quartermaster, each of whom should have a well organized office establishment. The paymaster would arrange the accounts of that portion of the service to which he belonged, providing each superintendent with funds for the payment of those followers under his command, checking the monthly accounts from transport officers, and submitting them to the head office with the Director-General. There is nothing so necessary to keep the followers of a transport service contented, as to pay them with rigid regularity.

The duties of the quartermaster would be of an arduous nature, and would consist in the receipt and issue of all transport material, carts, harness, saddles, line-gear, &c., &c. The keeping the ledgers of these stores is heavy work, and requires efficient and experienced clerks.

The Director-General would have a complete staff of experienced officers, among whom would be the chief transport paymaster and the chief transport quartermaster, through whom all accounts would go to Government.

In addition to the large number of commissioned officers with a transport service, there should be a very large proportion of non-commissioned officers and men to assist in the working of the train, and to help to infuse that discipline and regularity so really essential to efficiency. Under each assistant superintendent there should be two smart, active non-commissioned officers, and some six privates. I would suggest that in India, and where our Indian soldiers may be employed, one half of these non-commissioned officers and men should belong to the native army, the other half to the British service, and men who understand something of the language should if possible be

employed. In addition to the employment of the non-commissioned officers and men above referred to, it would be well that there should be a military transport police, that is, each superintendent of transport might have under him some 10 or 12 soldiers employed as policemen, of whom a certain proportion (at least half) should be mounted. They would exercise a very wholesome influence throughout the train, and much aid the officers and men employed in the executive work of the transport.

Thus for 2,000 animals with 500 followers there would be the following establishment of officers and men :—

- 1 Superintendent.
- 2 Assistant superintendents, each in charge of about 670 animals and 170 followers.
- 3 Non-commissioned officers, each in charge of about 335 animals and 85 followers.
- 18 Privates, each in charge of about 112 animals and 28 followers.
- 12 Privates, employed as military transport police.

From among the followers themselves a certain proportion of men should be chosen as mates, or as they would be called in India, jemadars, who would receive a little higher pay than the ordinary followers, and who would assist the non-commissioned officers and men in carrying out their duties, working under them of course. According to the animals and carts employed, there would be a proportion of shoeing smiths, camel doctors, carpenters, and leather workers.

And to this point, viz., having an efficient staff of artificers, shoeing smiths, and men who understand the diseases of the animals employed, special attention should be given; so that all harness, line gear, &c., may be kept in thorough repair, that the animals may be kept regularly shod up, and that when sick or galled, they may be speedily attended to. It is highly important that the sick list of animals should be as small as possible, for a sick animal not only does no work, but it wants some one to look after it.

It may be argued that many of the above suggestions entail a large employment of officers and men who would be valuable elsewhere. The actual number per 2,000 animals would be 4 officers and 24 non-commissioned officers and men employed in executive work, and 12 men employed as police, making a total of 4 officers and 36 non-commissioned officers and men. This appears very large no doubt; but the other side of the question is this, that from the thorough supervision which by the employment of this large number of men would be secured, an immense saving in the loss of transport animals would be effected, and the efficiency of the transport secured.

But when you come to think of what the actual money value to Government of 2,000 animals, or 1,000 carts with 2,000 bullocks is, I do not think this proportion too great. 2,000 camels would represent at least Rs. 140,000; 2,000 ponies about Rs. 110,000; 2,000 mules about Rs. 250,000 to Rs. 300,000; 1,000 carts with 2,000 bullocks

would represent at the least Rs. 200,000; and of course the more care taken of these animals, the more valuable they are to Government at the close of a campaign, and their sale would make an appreciable difference in the cost of a transport service.

I am convinced that the employment of non-commissioned officers and men in the executive of the transport is, as a matter of fact, quite, if not more economical, than the employment of civilians for the same duties. For instance, the inspectors of the transport service organized early in 1879, for the conveyance of an enormous quantity of stores, &c., to the army in Southern Afghanistan, received salaries ranging from 60 to 75 rupees a month, and certainly the work would have been more cheaply, and I am sure better done by good non-commissioned officers and men, who have all the advantages of having been educated to military discipline and regularity.

As I have before stated, when transport is worked by stages it is kept more compact. A superintendent would be in charge of one or two stages, according to the strength of the daily train, his officers and men with their respective animals divided among the two stages, or all at one. And it should be the endeavour of the directors never to separate officers from their particular part of the train; of course in working with convoys there would be some difficulty about this, especially with small convoys; but with moderately large convoys, it could be managed on the following plan. Say for instance a convoy of 1,000 animals or 500 carts has to start daily. A superintendent's charge consisting of 2,000 animals or 1,000 carts, it would be necessary to separate him by one day at least from half of his charge, but then two of his assistant superintendents would accompany the leading convoy, and he with one assistant would accompany the rear one, the artificers, &c., being equally divided. If the daily convoy consists only of 500 animals or 250 carts, then only one officer can go with each convoy. It should be the endeavour of the director of transport, if a superintendent's charge be split up in the way I have described, to send its component parts one after the other, without allowing a convoy from a separate charge to intervene, as its re-union in the quickest time will thus be secured.

I must now turn for a few moments to the subject of the engagement and pay of transport followers. The followers should if possible be engaged from those friendly districts adjacent to the country in which the campaign takes place, and through which the line of communication may pass. They are more likely to be accustomed to the climate, and feel as it were more at home.

The subject of the pay of the transport followers was the source of much trouble in the late campaign in Afghanistan. Men performing the same duties had been engaged, some at one place on one rate of pay, others at another place on another rate of pay, and of course, when together, those on the lower rate were naturally dissatisfied.

Each man on his engagement should be given a card on which his name, native village, district, date of engagement, and rate of pay should be written, and it should be signed by the officer who engaged

him. Every payment made to the man subsequent to his engagement should be entered on the back of the card by the officer making the payment, and the date up to which the man has been paid shown. Each follower should be clearly informed that he must always present this card before he can expect to receive his monthly pay.

There is one point of great importance which I have not yet touched upon, and that is the size of the packages to be transported. Large and unwieldy parcels cause an infinity of trouble. I have seen cases which from their size might contain a piano, handed over to a transport officer to carry; of course no pack animal save an elephant could have attempted to carry it. Unevenly shaped and weighted packages cause uneven loading, than which there is no more fruitful source of sore backs. No parcel should be of excessive weight; and they should all be made up of such size, shape, and weight that animals can be quickly and conveniently loaded with them.

The following table will show the carrying power of the various kinds of transport carriage:—

			lbs.	lbs.
Camels will carry from	..	..	320 to	450
Mules	..	..	160 to	250
Ponies	..	..	150 to	200
Men	..	..	30 to	50
<i>Carts</i> , with 1 pair of bullocks, on fairly level ground	..	..	800 to	900
Do. with 1 pair of bullocks, in hilly country	..	..	600 to	700
Do. do. 2 pairs of bullocks, on fairly level ground	..	..	1,200 to	1,500
Do. do. in hilly country	..	..	900 to	1,100

None of these loads are excessive, and animals in fair condition would carry them from 12 to 15 miles a day for many weeks continuously. It is not necessary in brief remarks of this nature to lay down the scale of food for the animals; that depends so much on the kind of food obtainable, the breed of the animals, the climate they are working in, and the work expected from them.

Now to turn to the other kind of transport, the regimental or corps transport.

Each corps should have attached to it sufficient carriages for the conveyance of the actual regimental stores, tents, &c., and seven days' rations. This carriage should be put in charge of an officer of the corps, with a fair proportion of non-commissioned officers and men, whose sole duty it should be to look after and maintain the efficiency of the regimental carriage; and as the comfort of each individual in a corps depends on the stores, tents, and food being properly transported, it can be concluded that the carriage would be kept in as efficient a state as possible. Given in the first instance a sufficient number of carts in working order, or pack animals in good condition, to carry the required stores, their subsequent efficiency would depend entirely on the state the animals and their gear were kept in. As has

been before remarked, transport followers, viz., bullock drivers, camel-men, muleteers, &c., are as a rule drawn from the dregs of the population, and for the most part have little or no experience of the animals which they have charge of; they are prone to neglect and ill-treat them unless looked very well after, and in looking after them would lie the duty of the officer and men in whose charge the regimental transport was placed. If animals are regularly fed, and in cold climates clothed, and the gear, particularly the pack saddles, kept in good order, most of the elements of efficiency are present. A corps after it has once started on the campaign should never have transport changed (unless from some cause or another it becomes unserviceable), or taken out of its charge, except in some case of especial emergency, or in the case of the corps going into standing camp for any length of time, and even then it would be advisable, if possible, not to remove it. It may be said that this system of regimental transport would take a number of men from the effective strength of each corps; possibly so; but surely it is better that this should be the case, than that the men should ever be without food or shelter, even for 24 hours, as Wellington says, "a starving army is worse than none." As regards the pay and rationing of the regimental transport followers, that also should be entirely under regimental control, and the followers of each regiment should have a distinguishing badge, so that there could never be any mistake as to which corps a man belonged to. Branding the animals and marking the carts with some distinguishing regimental mark would also be a good plan.

This regimental transport service is in my opinion of the utmost importance. It simplifies the whole transport service so much. The continual supplying of small numbers of animals, &c., from a transport service to regiments, and their subsequent return at some distant place, is a source of endless confusion and trouble connected with the men's pay, &c. I believe that no transport for an army can be thoroughly efficient unless the regimental or corps transport be adopted. The two services could work side by side without difficulty, and a corps with its own transport is always mobile, and is an ever ready factor of strength in an army.

The establishment of a transport service in time of peace, so as to secure increased efficiency in time of war, is a question entirely of expense. No country could afford to keep up a large transport service ready at any moment to take the field; but it is quite possible that certain "centres" of transport might be kept up, which would be capable of a rapid expansion on the breaking out of war. At these centres there might be a periodical "transport course." Through this "course" a certain number of officers, non-commissioned officers, and men might go, and they would acquire a great amount of practical knowledge connected with the animals and material with which they would have to deal if employed on transport duty in time of war.

It would be necessary to keep up at these centres a native establishment, not necessarily a large one. These natives could be instructed, some as shoeing smiths, some as leather workers, especially in the rapid

and efficient repair of pack saddles and line gear; some as carpenters, especially for the rapid repair of carts.

These experienced transport servants would, on the formation of a service for a campaign, be distributed among the newly engaged followers, and from their experience and training would be extremely valuable.

After "centres" such as I have described had been established a few years, Government would be able to lay their hands on a very large number of officers and men, who from their training would be invaluable in the formation of a transport service.

It appears to me, that a very few of these "centres" kept up on sound principles during peace, would be a very great element of strength in time of war.

As regards the regimental or corps transport in time of peace, somewhat the same plan might be adopted, only the men who would form the nucleus of the regimental shoeing smiths, carpenters, &c., should in time of peace remain at the "centres" I have just been speaking of. An officer, with non-commissioned officers and men, who had been through the transport course would, on a regiment being provided with transport for service, immediately take charge of this carriage, and then they would find how valuable was the knowledge they had gained while going through the transport course.

For reasons I have stated in the first part of this paper, I consider that all animals employed in a transport service should be the property of Government.

And now, Sir, I must conclude. I must thank you all for the very patient hearing you have given to my discourse on what is at best a dry subject, though to no soldier can the question of transport be altogether uninteresting. Before I sit down, however, let me ask you, ladies and gentlemen, to turn with me once more to the map, and glance at the town of Bagh, and in your mind's eye imagine a solitary little camp some marches out of Quetta.

These two places have a melancholy interest for all those connected with the operations which I have described in the first part of this paper, for at each of them we lost a transport officer; at Bagh Lieutenant Ventris of the Buffs, and at that lonely camp, Captain Perry of the 40th Regiment.

I cannot let this occasion pass without paying a tribute to their memory, hardworking, zealous, and efficient transport officers, whose health succumbed at last to fatigue and to the climate in which they were working; they struggled on bravely to the end, and then dying sacrificed their lives to their duty.

The CHAIRMAN: I now invite discussion on this very interesting subject, and I do so with pleasure because I see many here who have given particular attention to this question of transport, and amongst them some who are very well acquainted with the districts to which the Lecturer has referred.

General Lord MARK KERR, C.B.: I wish to say one word, in consequence of a remark made by the Lecturer. It is this, viz., that without means of transport in time of peace, we cannot expect to have it ready in case of war. For many years I have endeavoured to impress upon our public men that whether in India, Africa, or England, we should have, not only a nucleus, but enough of well-built carts and

waggons—on the American, and not the English unwieldy and cumbrous style—and then we may get animals to draw them when war occurs. But you cannot improvise the transport carts. This is an important truth which England has always seemed determined not to realise.

General Sir ARTHUR CUNYNGHAME, G.C.B.: Having been requested by Sir Garnet Wolseley to say a few words upon this subject, I am perfectly willing to do so, otherwise I should not have intruded upon your time. I entirely agree with Lieutenant Dean-Pitt as to the desirability of purchasing transport for war whenever it is possible, rather than depending upon hired transport. I agree, also, that we should have a small nucleus whereby non-commissioned officers and men, and Officers, may be instructed in transport duties during a time of peace, so as to be in readiness when a war breaks out, and further, that they should be especially instructed in the repair of saddles, carts, &c. Having experienced the advantage of cart transport I concur in the advisability of its adoption wherever possible, which it almost invariably is, but being strong it also should be light; and I desire to record the great advantage—in countries such as China, South Africa, and India—of Coolie transport as one of the most effective methods which can be adopted. I will only add that I generally agree with Lieutenant Dean-Pitt in his remarks in the excellent paper which he has read to us upon this interesting and most important subject.

Colonel DEANE: The axiom enunciated by General Lord Mark Kerr was recognised by the late Duke of Wellington, who found it necessary to found an establishment at Mysore for the breeding of cattle, called the "Amrut-Mahal," from which the celebrated Mysore breed of cattle emanated, that enabled him to carry out his campaigns in Southern India, and that establishment exists to this day. It has deteriorated in a great measure, but is still carried on under Government, the necessity for such an establishment being, I believe, the result of practical experience in that part of India.

Colonel MALCOLM GREEN, C.B.: With regard to the heat in the district to which the Lecturer has referred, I may mention that in one instance, early in March, 1855, I was crossing with a cavalry detachment of 400 men and horses from Jacobabad to Sherpur, 30 miles, and we lost 117 horses from the effects of the heat. That was in March, but I believe the men in the case referred to by Lieutenant Dean-Pitt worked in that climate as late as the early part of June.

The CHAIRMAN: Allow me to thank the Lecturer, in your name, for the very interesting lecture he has given us. The subject is one of deep interest, not only to the military student, but to the nation at large, and it is of especial interest to the commander who is sent with a body of troops into the field against an enemy. Before entering upon a campaign I know nothing so vitally important to the safety of the force as this question of transport. I think if you will study the history of our various little wars and our various little expeditions, especially those carried on in mountainous countries, you will find that those which have failed, or which have done worst, have been those in which the arrangements had not been previously well worked out in the minutest detail with reference to the amount of baggage to be carried, or the number of animals required for its conveyance. The Lecturer referred, towards the close of his remarks, to the great difficulties encountered by those in charge of transport service owing to the great size and weight of the various packages to be carried. I have been witness to this difficulty during field operations, and it is a point that should not be neglected by those who have to frame the plans for a campaign. I should say that, as a rule (of course you may have munitions of war which will be exceptional), the baggage should be put together in packages of not more than 50 or 60 lbs., so that they may be easily handled and passed from one man to another, and also easily loaded on pack animals, two or three, or four, making up an ordinary load. If you will read the accounts of the campaigns of all the great commanders in ancient times, Hannibal, Caesar, Alexander, and others, you will find that the question of keeping up the line of communications, the question of transport, was a matter of very small importance compared with what it is now. Even the largest armies—those of Xerxes and Gengis Khan—when in the field fed upon the country which they invaded, and they took care never to move except when the crops were ripe. The munitions of war were supplied by the forests, from which they made their bows and arrows, and the pebbles of the stream supplied stones for

their slings. They required no powder and shot, no great scientific appliances, no great reserves of provisions. As for the sick and wounded, I fancy the appliances for healing them were of the simplest nature, perhaps by no means the worst; they depended upon nature to cure them. So that to move a large army was a simple matter compared with moving even a small detachment under the conditions of modern warfare. I remember that the greatest of modern commanders—Napoleon—when discussing, towards the close of his life, that great campaign (although it ruined him and his country), the campaign in Russia, and the arrangements he had made for keeping up his line of communications, for feeding the army along that line, for collecting supplies of all kinds, and for receiving news, boasted that not a single postboy between Moscow and Paris had lost his way or was killed, so exactly had he foreseen every difficulty and made all the arrangements necessary for carrying on a great campaign in an enemy's country at a very great distance from his base. In fact, to command an army in the field, in action at least, is a much simpler operation than to feed it. That is not an original remark of mine. It was Wellington who said that anyone could command a body of troops in a great battle, but there were few who could feed them after the battle was over. I fully concur in what the Lecturer said with regard to the description of transport to be used. It is a sort of axiom, and it will come home to every one who thinks over the subject, or has had any experience of warfare, that the worst description of transport you can have is pack animals. A sort of superstition has come to us from the times of the Peninsular War, which we carried on in a country where there were no good roads, and most of the lines of communication were through bad mountainous districts, that pack animals were a good means of conveying the baggage of an army, and our regulations were based upon that supposition. The fact is that where you have even the most ordinary track across a moderately level country, carts of the worst description are much better than the best description of pack animals. Camels are much better than most other animals, for the good reason, that with them you avoid the great general objection to pack animals, namely, that in a long march of ten or twelve hours, while men may lie down, the pack animals, which cannot be unloaded, must carry their burden the whole of the day. A camel, during a halt of half or a quarter of an hour, can lie down and obtain a certain amount of rest. Then there is another description of animal that must not be forgotten, the ox. Colonel Desne has referred to the use of oxen in Southern India. They were used largely by the Duke of Wellington in his campaign there. There is one point in their favour that ought not to be overlooked, that if they are about to die from being broken down, or having sore backs, you can always eat them, and that is a matter of great importance. The Lecturer has referred to the question of the military organization of transport, and I think every one who has studied the subject in foreign armies, or in our own, will agree with him on that point. The greatest possible element of disorder, inconvenience, and failure that you can introduce into any military operation is to make use of a large number of civilians, collected, as the Lecturer said, from all parts of the world, the riff-raff of society, turning them over to some poor, unfortunate officer whose great desire to see active service has induced him to accept this occupation. I cannot imagine a greater element of misfortune in an army than a transport composed of drivers of that class. As Lord Mark Kerr has said, it is absolutely necessary that you should have in times of peace a certain amount of transport, especially of transport material. In thinking over the transport requirements of a campaign, it is necessary to divide the subject into three parts (the Lecturer said two). The first division of the transport should be purely regimental, to be employed upon what may be regarded as simply regimental work, that is, the conveyance and distribution of ammunition, military supplies, and food for the troops engaged. The distribution of supplies is effected from temporarily established depôts, located at central points in rear of each division, each brigade, or each unit. The transport between these temporary depôts of distribution and the intermediate base (not the great base from which the army draws all its supplies), I think will have to be done generally by what the Lecturer has called the general transport of the army. Then comes the third description of transport to which the Lecturer has not referred, that is the transport required for keeping the magazines at the intermediate base of supply filled and in a condition to supply the

army in the field with provisions. Reference has been made to the danger of depending upon the inhabitants of a country for men to drive your transport waggons and to take care of your transport animals. I remember that a few days after we left Tientsin, when we were advancing upon Pekin (we then believed that everything was to be peaceably arranged; although all military precautions had still to be taken), we woke up in the morning and found that all our drivers had bolted. Our transport consisted of carts that had been supplied to us by the Chinese Government, by contractors, and the country generally. I do not think that the carts were carried away, but all the mules and men had disappeared, except three drivers who belonged to me. I was very much astonished that these three men had not bolted also. I was then in charge of the topographical work of the force, and I had a small detachment of cavalry with me, and a very excellent duffadar in charge of it. I asked him in the course of conversation how he had managed to keep his men. I had previously told him that unless he looked after them well he would never get to Pekin. He then said, with great diffidence and reluctance, "I remember what you told me, and the fact is, I tied the tails of those three men together over night, and then tied them "to the tent pole, and put a man over them." I mention that as an illustration of the difficulty of keeping or depending upon men who have no interest in the war as far as your side is concerned, but merely serve you from compulsion or for pay. There is one other very important point bearing directly upon the transport question, but as it is, I believe, under discussion at the present time, I shall say but little about it (it has been under discussion for the last 20 years, as long as I have been in the army), viz., whether the transport should be an integral portion of the Commissariat Department, or be worked by a purely military organization. I have no hesitation in saying, as far as my experience goes, whatever it may be worth, I have never, in any part of the world, seen the transport under the Commissariat without its breaking down. The Commissariat, as the Lecturer has said, has quite enough to do to feed the army, without looking after transport animals. A very large portion of the Commissariat Officers are hard worked, excellent men, who do their duty to the best of their ability, but their education is not such as to enable them to be judges of horses, or bullocks, and I do not think they are well calculated to whip into shape, to organize, and to command a great Transport Department, hastily put together when war is declared, and composed of such men as those whom we must always expect to have in the transport service, nor do I think they are the best men to keep it in a state of efficiency. I do not know that I have anything further to add. I will merely say in conclusion that it is only by the collection, after a campaign, of the sort of information conveyed to us in the lecture of to-day that we are able to draw up effective regulations for the guidance of our transport service in the future. If it were for nothing else than the information thus supplied by the Lecturer this afternoon, I am sure I should be justified in presenting to him, in your name your best thanks for his valuable and interesting lecture.

BETWEEN RUSSIA AND INDIA.

By Captain T. HUNGEFORD HOLDICH, R.E.¹

THE present occupation of Afghanistan by an English force has afforded considerable opportunities for gaining both political and geographical information about the rough country which lies between Russia and India, which may ultimately help to place England in an attitude of much greater assurance towards her powerful neighbour than she has lately occupied. Whatever may be the views of military men either in England or India, on the subject of a Russian invasion of India, the geographical position of Russia in Central Asia must always be a matter of the keenest interest to many who look forward, not to an invasion of India, but to a threatening attitude towards Herat, on the part of Russia, as the almost inevitable reply to the use we lately made of Indian troops at Cyprus. Should another such occasion arise, without attempting to discuss such a question as the claims of Herat to be considered the strategical key of our Indian possessions, there can be no doubt that the constant reiteration of the cry that "Herat is the key of India" has had its effect on the minds of the natives of India generally; and the occupation of Herat now, by a foreign Power, would tend to disturb them perhaps dangerously.

The matter must inevitably go on gathering interest from day to day, and for this reason, perhaps, a map showing within a small compass the distances along the best known and only practicable routes between the present Russian frontier and India, may not be without its convenience as an easy reference towards forming a conclusion as to what it is reasonable to expect of Russia, and what is quite unreasonable.

It may, moreover, further help somewhat to set straight some very erroneous statements as to distances along important strategical lines which have lately appeared in popular books and periodicals; but it should be understood that no attempt has been made to embody the results of recent surveys in a map on such an insignificant scale; and the distances here given are merely the result of a careful comparison of various authorities (some of them Russian) which it is open to any one to consult for himself, weight having been given to those which appear *most probably* accurate. In view, too, of recent displacements which have taken place in parts of Afghanistan geography, which were supposed to be very fairly well known, it would be exceedingly rash to attempt to put too fine a point on the accuracy of that which never has been (a good deal of it) much better than mere conjecture.

In improving our very imperfect acquaintance, both with the present military resources and position of Russia in Central Asia, and of the difficulties presented both geographically and by the national characteristics of the races that she would have to encounter in an advance south

¹ Chief of the Survey Operations, Camp Kabul.—Ed.

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of the Oxus, a good deal has been already learnt from the Afghans themselves. Among the turbulent tribes dwelling in and around Kabul, whose chief and keenest interest always lies in that which bears more or less directly on their chances of success in mere faction fights, which they seem to regard as the highest occupation in life, the Russian factor in the general game must be a matter of constant discussion. We have no reason to suppose that they would be a bit more tolerant of the Christianity of the Greek Church than they are of that of the Church of England; either form is an abomination to them, but amongst such an intrigue-loving, border-fighting people, it is not likely that every chance of fortune that may arise from their political and geographical situation between the two great rival Christian nations is not a matter of much speculation and intrigue. Thus it may possibly arise from their individual interest in their national position that there is no better natural geographer in the world than the Afghan of the Kabul district. There is often an exactness about his method of imparting information (sometimes a careful little map drawn out with a pointed stick on the ground) which would strike one as altogether extraordinary, but for the reflection that this one accomplishment is probably the practical outcome of the education of half a lifetime.

It is fortunate that native information is on the whole so trustworthy (the one weak point being, as usual, the matter of distance) for there are some other characteristics of the tribes bordering the northern routes from the Indus to Kabul which make it a matter of exceeding difficulty for a surveyor to procure much information in the way of mapping, by means of the direct evidence of his own eyes; so much so, that probably no military expedition of late years has afforded so little opportunity of obtaining exact geographical information under cover of the military occupation of a certain line of route. Still the results of survey operations in Afghanistan are not unimportant. We have gained enough general information about some of the routes and passes south of the Oxus to be warranted in hazarding conclusions as to the chances of successful military operations along them, and we have secured all the detailed information about the districts which lie between Kandahar or Kabul and the Indus, that can be wanted for strategical deductions.

Russia's bases of military operations towards India are two, one on the Caspian Sea at Krasnovodsk, and Chikishliar, with outposts at Chat and Kizil Arvat, and the other on the line of Khiva, Bokhara, Samarcand, and Marghillan, which may roughly be said to represent the frontier held (together with a large extent of boundary south of Kuldja) by the Army of Tashkend, under General Kaufman. But between this latter line and the Oxus, Russia is undoubtedly already the dominant Power. The mere fact of Russia having already thoroughly explored all these regions, gives her the key to their future disposal. There is no doubt that in all matters relating to the acquirement of geographical knowledge, where it bears on possible military operations, Russian perceptions are of the keenest. Her surveying energies appear to be always concentrated on that which yet lies just beyond her reach,

rather than in the completion of good maps to aid in the right government of that which has already been acquired. The journeys of M. Maieff, of Oltshanin, of Ujfalvy, and of Grodekoff, have already added much to her store of knowledge of the trans-Oxus districts. The purely scientific results of these journeys have been probably freely given to the world; but it is not at all likely that her military knowledge has been made public property; and this knowledge of routes and passes, of ways and means, throughout a district with which we can never, under any circumstances, interfere, justifies us in regarding the line of the Oxus river as her practical frontier. Very possibly her military resources at Tashkend are by no means sufficient to enable her to assume immediate and direct control over the Turko-mans and Usbeks, who people the country between Samarcand and the Oxus, but it can only be a matter of time. With what lies north of the Oxus we can have very little to say or to do; therefore it matters the less that in reality we know very little about it. The Oxus is not a fordable river. At Khoja Saleh, which is the furthest point supposed to have been reached by the Aral flotilla, it is about half a mile wide, with a slow current. At Charjui it is about the same width, only rapid and deep. At Karki it is said to be 1,000 yards wide, and Kilif perhaps a quarter of a mile. But at all these places there are ferries, and there would be ample means of crossing an army corps if we take into account both the Aral flotilla and the native material in the shape of large flat-bottomed boats capable of containing 100 men each, used for ferrying purposes, of which there are said to be 300 between Kilif and Hazarasp. These boats are drawn across the river by horses, swimming with ropes attached to their manes. But under any circumstances it seems about as unlikely that any British force would oppose the passage of a Russian army across the Oxus as that it would interfere with the Russian occupation of the trans-Oxus districts; but once south of the Oxus, many new conditions of opposition would come into play, arising principally from the very different national characteristics of the southern races to those further north. It would no longer be a matter of persevering advance through sandy and waterless deserts, or over wild and rugged mountains, difficulties which in themselves have never yet retarded the advance of a determined General, but there would be the reception that any Christian foe would almost certainly meet at the hands of a warlike and powerful people, who can unite with all the cohesion of religious fanaticism, backed up by something like military organization and a perfect acquaintance with the strategical conditions of their country. The peace-loving agricultural Aryan of Zarafshan and Karategin (whose land must be a very Utopia, according to M. Ujfalvy) is evidently a not very remote connection of the Kafir of Kafiristan. Our recently improved acquaintance with the Kafir leads us very much to modify the generally received opinions as to his natural fierceness and warlike propensities. It is nothing but the natural strength of his country which has preserved him from utter extermination, and also perhaps the gradual change of his faith from a mixture of Buddhism and Brahminism, accompanied with many Zoroastrian rites, to the faith of

Islam—a change which has been going on gradually for centuries, and which has turned the Kafir agriculturist into the Saffi, the Nimcha, and the Dehgan races, which are now distinguished for their fanaticism. Neither could we look to the Usbeks and Turkomans of Afghan Turkestan as likely to embody anything like the fighting capabilities of the Kohistani and Ghilzai. Most probably there would be no serious local opposition to the occupation by Russia of a line extending from Balkh eastwards through Khulm and Kunduz to Faizabad and Sarhadd, all of which places can be reached without great difficulty from the Oxus, and are connected by excellent lateral road communication. But the occupation of such a line could have but one possible object, which would be to conceal the actual line of further advance. Each of these places may be said to dominate a pass to India over the Hindoo Kush. Opposite Sarhadd is the Baroghil, leading either to Kashmir or to Mastuj and the Kunar Valley. Faizabad commands the Nuksan Pass. Khulm looks southwards to Ghozi and the Parwan Pass into Kohistan, while from Balkh two main routes diverge, one to Bamian and Kabul, the other to Maimana and Herat. It would be a great mistake to suppose that this short bit disposes of all the practicable passes over the Hindoo Kush. The range is a singularly well-defined one throughout its vast length; but it is not by any means a range of startling peaks and magnificent altitudes. It is rather a chain of very elevated flattish-topped hills, spreading down in long spurs to the north and south, abounding in warm sheltered valleys and smiling corners, affording more or less pasture even in its highest parts, and traversed by countless paths. Many of these paths are followed by Kuchis in their annual migrations southwards, with their families and household goods piled up in picturesque heaps on their hardy camels, or with large herds of sheep and goats in search of fresh pasturage. In short the Hindoo Kush is singularly ill adapted for a defensible frontier line. Probably presenting a hardly more effective barrier than the Balkans, it is certainly by no means the rough and impassable mountain chain that popular fancy has painted it. A description of these passes will be found in Colonel Macgregor's Gazetteer of Central Asia, and at present there is nothing that we can add to what is already known. South of the Hindu Kush we find most of these Eastern routes to our north-west frontier to converge in one point, very near to Jellalabad. There are certain routes existing between the Russian frontier and India which pass altogether east of this point. There is one which can be followed from Tashkend to Kashgar, and over the Karakoram range, and another which runs by the Terek Pass to Sarhadd, and thence over the Baroghil into Kashmir; but these routes have justly, and by almost universal consent, been set aside as involving difficulties of such obvious magnitude that it would be unreasonable to suppose that any army under competent leadership could be committed to them. The same might surely be said of the route by the Nuksan Pass into the Valley of Chitral and the Kunar, which joins the Khyber route not far from Jellalabad. Its length and intricacy alone, independently of the intractable nature of the tribes which border it on either side, and of

the fact that the Nuksan Pass is only open for half the year, would surely place it beyond the consideration of any General who aspired to invade India after accomplishing the feat of carrying an army through it. It is just in this corner of our maps, especially with reference to the districts of Badakshan and Kafirstan, that considerable alteration in the geography, which has hitherto necessarily been very sketchy, will probably be required. The geography of Kafirstan, as far west as the Khák Pass, is by no means the simple problem that it appears to be on present maps, and all new information tends to show that for all marching armies this part of the Hindoo Kush must be regarded as an impracticable country, and that we must look still further west for any route that is at all likely to be adopted. West of Kafirstan across the Hindoo Kush are, as we have said, passes innumerable, but only three which need be regarded as practicable for an advancing force, all the others more or less converging into these three. There are the Khák, the Kaoshan (or Parwan, also called Sar Alang), and the Irak. The Khák leads from Kunduz *viâ* Ghorî and the Valley of the Indarab to the head of the Panjshir Valley. Its elevation is about 13,000 feet. It is described as an easy pass, probably practicable for wheeled artillery. The Panjshiris are Tajaks, and, like the Kohistanis generally, are most bigoted Sunni Mahomedans. The rich and highly cultivated valley which they inhabit forms a grand highway into Kohistan and Koh Dahman; but all this land of terraced vineyards and orchards, watered by snow-cold streams from the picturesque gorges and mountain passes of the Hindoo Kush and Paghman mountains,—this very garden of Afghanistan, stretching away southwards to the gates of Kabul, is peopled by the same fierce and turbulent race who have ever given the best fighting men to the armies of the Amirs, and who have rendered the position of Kabul as the ruling capital of Afghanistan (far removed from the Durani districts, which have supplied Afghanistan with its rulers) a matter of necessity. The Kohistani and the kindred clans of the Panjshir and Laghman Valleys likely enough derive their characteristics of blind fanatical hatred to the unbeliever from the fact that they are, after all, comparatively recent converts to the faith of Islam; but with their instincts of religious hostility they combine such rare good fighting qualities that it will probably be found that the Kohistani, rather than the Hindoo Kush, is the real barrier between the north and the south. The Sar Alang or Parwan Pass leads directly from Kunduz and Ghorî to Charikar and Kabul. It is the direct military route between Afghan Turkestan and the seat of the Afghan Government, but it is not much used for trade, from the fact of its passing through Koh Dahman (a province of Kohistan). But it should not be overlooked that the northern side of this pass is held by the Hazaras, a race of Shiah Mahomedans, who have nothing in common either in race or religion with the Kohistani Tajak. Its probable elevation is very much less than that usually accorded to it. It cannot be much over 11,000 feet, and it is known to be an easy pass, though somewhat destitute of fuel and forage. The next route of importance is that which leads from Balkh *viâ* Bamian to the

Irak Pass on the Hindoo Kush, and into the upper watercourse of the Helmund river, and thence by the Unai over the Paghman range to Kabul. This is the great trade route from the markets of Turkestan and Central Asia generally to Kabul and India. The Irak, like the Parwan, is not nearly so high as has been generally assumed, while the Unai is a notoriously easy pass. This route is at present very much better known to the Russians, who have lately frequently traversed it, than to ourselves. Like the Parwan and the Khák, it is liable to be closed for three or four months of the year by snow, or by the formation of slippery ice coatings on the pass when the snow begins to melt. Of course the period during which these passes are closed varies much with the season. During the winter of 1879-80 they were open till late in December, and appear to be again free from snow about the middle of April. Between these main passes innumerable tracks follow the "durras," or lines of watercourse, over the ridges of the Hindoo Kush and Paghman, which afford easy passage to men on foot and frequently also to "Kachi" camels. These passes (so far as we can learn) could, any of them, be readily made available for mountain artillery with a very small expenditure of constructive labour and engineering skill. In Koh Dahman nearly every village of importance lying at the foot of the eastern slopes of the Paghman (such as Beratse, Farza, Istalif, &c.) covers a practicable pass over the Paghman, which has its continuation across the Shoreband valley and over the ridge of the Hindoo Kush beyond it. But between the Khák Pass and the Irak, the various routes across the Hindoo Kush, whether regarded as roads to India or to Kandahar, although they by no means converge on Kabul city, must necessarily pass within striking distance of an army occupying Kabul. All routes east of the Khák may, I think, be fairly set aside as beyond the limits of all probable military action; and if we accept those west of the Khák, connecting Afghan Turkestan with Kabul, as possible, it remains next to consider which of those diverging from Kabul or its immediate neighbourhood towards Kandahar or India are at all likely to be available to an advancing force from the north. Such a force would have, first of all, thoroughly to secure its communication with the Oxus, and a strong position at Kabul itself; an assumption of which the meaning can best be appreciated by those who know what it has cost England to establish an army there, without any but local opposition. An advancing army that meant to reach India would never make Kandahar an objective point from Kabul; it would only march on Kandahar in conjunction with another force from the Caspian base, and would then be diverted into other southern routes, which we will consider presently. But if it could ever be seriously contemplated to invade India from Kabul only, it would be absolutely necessary to divide a large force between Kabul and Ghazni to protect the line of advance to India from the side of Kandahar, which, with excellent lateral road communication, would almost command the line from Kabul to India. There remain, then, three routes from Kabul to India to choose from, viz.: (1) that by the Gomal river from Ghazni to Dera Ismail Khan; (2) the direct Khyber

route to Peshawur; and (3) the Kuram Valley route over the Shu-targardan. The practicability of the former may still be regarded as an open question. Under any circumstances, it is unlikely that it would be made the main line of advance in preference to the broad highway of the Khyber route or the equally well-known Kuram road. The published maps resulting from the Surveys of 1878-79-80, will show how many routes there are between Kabul and the Khyber, and the exact nature of them is definitely settled for all future time. All that need be said of them is that they converge at Lundi Kotal, a place about 5,000 feet above the sea level, with a tolerable climate, and thence can pass by the Khyber only to Jumrood and Peshawur. Between the Khyber route west of Lundi Kotal and the Kuram, there is for at least nine months of the year practicable lateral communication, so that it is probable that an invading army would have to make use of both routes simultaneously in order to secure its communications. If it were not for the Kuram route, Lundi Kotal would possess all the strategical advantages in position that Kabul possesses; but as things stand, Kabul is the only place commanding not only the routes which converge from the practicable passes of the Hindoo Kush, but also those diverging towards our Indian frontier. On the other hand, the position of Kandahar with reference to any force advancing from the Oxus over the Hindoo Kush to India is most important, considering the nature of the road between Kandahar and Kabul, and the nature of the resistance likely to be encountered along it, Kandahar becomes much nearer to Kabul than the mere measurement of distance will make it. With Ghazni and Kabul in the hands of a friendly Power, Kandahar would be nearer the Khyber than Balkh is; and this fact must be considered in conjunction with the views of the Afghans themselves on the subject of national friendship, if we wish to decide on the relative advantages of holding Kabul or leaving it to take care of itself. They have surely given us trouble enough in Kabul to teach us to respect their position as enemies. "Afghanistan for the Afghans" is their motto; and it might be well to turn their powers of dangerous hostility to an invader to better account by resigning the position of invaders ourselves, and leaving it to our Christian foes. It is well known that it is not the strategical position of Kabul which makes it the only place from which the Amirs of a Durani dynasty, far removed from the support of the Durani section of the Afghans (which lies chiefly in the direction of Kandahar), have been able to rule Afghanistan effectually. It is its peculiar position relative to the real fighting races of Afghanistan that has made it the capital of the Empire. Kabul is not a great trade centre, that is to say, not in the sense in which Kandahar or Khulm are trade centres; but it marks the point where the Ghilzai and the Kohistani can best be overlooked, while it is also a capital watch tower for the Turkoman and Usbeg tribes north of the Hindoo Kush. While Kabul is a power in the hands of an Afghan ruler, it can but be a weakness and a strain upon the resources of the stranger who wishes not to govern Afghanistan, but to make Kabul merely one strategical step on his onward way. So long as the highways of the Khyber and the Kuram are carefully guarded

from the Indian side, Kabul with its turbulent fighting crowds under a ruler favourable to British interests might possibly be accepted as being quite as effective a barrier against northern aggression as any of Nature's devising.

In the map which accompanies these notes, extra care has been taken to secure as much accuracy as possible in the distances given, where these distances are of special importance. This is the case on that side of it to which we now refer; and it is unfortunate that authorities should disagree very considerably in a matter which is all-important in estimating the value of certain strategical points with reference to Herat. It cannot be a matter of much surprise to any one who knows the caution exercised by our political authorities in all matters of exploration, that survey operations during the late campaign should have done next to nothing to enlighten us as to what lies beyond Girishk in the direction of Herat from Kandahar. On this side of Afghanistan we are really rather indebted to Russian sources of information for anything new that we have learnt of late north or west of the Kandahar-Ghazni line. But the actual survey of one new and important route between Kandahar and Dera Ghazi Khan, with the geography of nearly 8,000 square miles of country adjoining the Bori Valley, which that route follows to the Sulimani range; and the establishment beyond any further doubt of the existence of another equally good route *viâ* the Zhob Valley from the Pishin to Dera Ismail Khan, renders it all the more a matter of congratulation that the Pishin-Kandahar line which dominates so many important routes to our Indian frontier should be permanently held. If Herat is so much the key of India that the occupation of it by Russia would be a severe threat to our Indian Empire, the importance of holding Kandahar can hardly be over-estimated; and in view of all that may yet arise to complicate our political relations in this corner of the world, all that we can learn about the line of communication between Kandahar and Herat, between Herat and Merv, between Merv and Sarakhs, or Merv and Charjui, becomes of so much importance that no effort should be spared to secure it.

There are four distinct lines by which Russia could move on Herat:—

(1.) From the Caspian base a trans-Caucasian army corps could move (only with the concurrence and alliance of Persia), by the Mashad route direct;

(2.) Or it could move outside Persian territory, from Chikishliar by the Bendessen Pass to Askabad, and would then have to pass through Persian territory to Sarakhs, or across the desert to Merv;

(3.) From the Tashkend-Bokhara base a route exists *viâ* Charjui, the Oxus, direct to Merv; and there is

(4.) Also the well-known road by Balkh and Maimana, direct to Herat.

The Persian route, from Askabad to Mashad and Herat, has been often described by writers on Persia, and can be set aside for the present as involving a direct alliance with Persia.

The route *viâ* the Attrek and Bendessen Pass to Askabad has recently

been partially illustrated by the Russian advance to Dengil Tepe, in the "Journal of the Institution," No. CIII, of 1879.

From Krasnovodsk to Kizil Arvat the distance given (195 miles) is the mean of the Russian value (as given in the Russian official map) and of Walker's Turkestan, which agree very closely, as also in the distance from Kizil Arvat to Sarakhs. Between Sarakhs and Herat, by the Har-i-Rud, there is considerable divergence of opinion, and it is impossible to say whether the 210 miles here given may not be found 10 to 20 miles in error. About the position of Abiverd, again, there is an extreme difference of no less than 40 miles in its distance from Sarakhs, as given by the best authorities; and it may be remarked of all these distances, that Mr. Boulger, in his work on England and Russia in Central Asia, differs so widely in his statements from the results of careful map measurement, that his views have been found altogether irreconcilable. Now, about all these routes from Central Asia to Herat there can be no doubt that Russia has excellent sources of information, and is already far better acquainted with details than we are ourselves. But what we know is known with tolerable certainty, and statements which appear in public Russian papers from time to time, merely asserting in general terms that certain of these routes have been found to be impracticable to the advance of an army corps, or that they are of exceptional difficulty, should certainly be received with caution. On the whole (setting aside the question of water and forage, which may generally be said to go together), it must be obvious to any geographer that the physical characteristics of the countries bordering the wide sandy deserts of Central Asia must be of a nature which would involve far less difficulty in the conduct of military operations on a large scale than those further removed from them. The changes of nature in the physical conformation of the earth's surface are seldom abrupt, when a large extent of surface is under consideration, and the roughness and difficulty of the district intervening between the Central Asian deserts of sand and the mountain chains of Afghanistan is certainly not the same as that of the mountain chains themselves. On the whole then, doubtless, all the routes to Herat from Central Asia are practicable and easy. There is only the one important consideration of water to be carefully weighed in each case. With the Attrek route from Chikishliar by the Bendessen Pass to Askabad, we are already fairly well acquainted, but from Askabad to Sarakhs there is a want of direct evidence as to details. It is known to be a fairly well watered country, with some capability for cultivation, traversed by a well-marked road. There can, indeed, be very little doubt about disadvantages to an advancing force, but for the fact that from Abiverd to Sarakhs, under the northern slopes of the Gulistan and Kelat-i-Nadir Hill, is Persian territory. It will probably not be long ere we know whether any parallel route exists between Askabad and Merv outside of the Persian frontier.

Between Sarakhs and Merv, again, the road is said to be open and easy, and water fairly plentiful. It can scarcely be doubted that Sarakhs bears a considerably greater strategical importance towards Herat than Merv, so much so that were Persia hostile to any advance

on Herat, the possession of Sarakhs would be indispensable to secure the success of an advance from Merv southwards. Indeed, there is only one direction from which an advance on Herat could be securely conducted without the passive consent of Persia, and that is from Balkh by the mountain route. But with Persia's consent, either from Sarakhs or from Merv, there is a good practicable high road to Herat. From Sarakhs, the route follows the line of the Har-i-Rud valley all the way to Herat. This valley is narrow, but fertile, although the marauding character of the Turkomans and Hazaras who inhabit it, prevents the settlement of cultivators. The Har-i-Rud River supplies the irrigation from the fertile valley of Herat, and, in consequence, it is at certain seasons much diminished in volume immediately below that city, but beyond that it again acquires a considerable flow and body of water, which is maintained all the year round. From Merv to Herat the road follows the course of the Murghab for about 100 miles, through the Dasht-i-Gul. Burns and Shakespear have both described this part of the country.¹ The valley is narrow, bounded by sand-hills, the river being deep and rapid in the neighbourhood of Merv, and fordable only at certain points with difficulty. About Yalatun and Merv there is much grain cultivation maintained by the Turkomans, while the banks of the river produce rich fodder and thorny food for cattle. Yalatun is described as fertile, well populated, and unhealthily. From Panjdeh, where the river is said to be sometimes fordable, the road follows the Khushk River, and ascending the Koh-i-Baber Pass, over a range of no great altitude, descends into the Herat valley immediately beneath it. The Khushk River occasionally much diminishes in volume from the drain on it for irrigation purposes, and the Khushk district (held by the Jamshidis) is said to be fertile and picturesque. Certainly there are no signs here of any insuperable geographical difficulty to prevent an army of respectable dimensions reaching Herat either from Sarakhs or Merv. On the routes from Bokhara and Samarcand to Merv we are quite at liberty to speculate as much as we please, because Russian information about them must be so very much better than our own. From Bokhara to Charjui, and indeed from Charjui to Merv, is so entirely beyond the limits of every practical opposition from England in the field that we can regard with national equanimity the terrible sufferings from suffocating heat and intolerable thirst that must surely be endured, more or less, by any force advancing along those lines. From Charjui to Merv is 150 miles, involving six days' march, by the wells, across a sandy shelterless desert, including one march of at least 40 miles. Of the places where wells are supposed to exist, as marked in Walker's Turkestan, one of them, Pindi, is now said to be doubtful. From Bokhara and Samarcand to Charjui on the Oxus there are routes well known to Russian geographers, which would present no great difficulty, but between Charjui and Merv it may well be doubted whether any army could be moved without arrangements to secure a water supply much greater than that which exists at present.

¹ Abbott also: see "Journeys between Herat and Khiva," in No. LXXX (vol. xix) of the Journal.

The fourth route, the most direct, and possibly the most important ultimately, is that from Balkh *viâ* Shiburghan and Maimana to Herat. Of this route we have the accounts of Palmer and Ferrier, and, more recently, those of Colonel Grodekoff of the Russian Staff, who traversed it as lately as 1877. From Balkh to Shirburghan, both Ferrier and Grodekoff agree as to distance (60 miles), although Ferrier's route lies apparently to the north of Grodekoff's. From Shiburghan to Maimana, Ferrier's route is west of Grodekoff's, and passes *viâ* Khorasan, Guzar, Khairabad, and Ishin, a distance of 70 miles. The Russian route *viâ* Saripul is 92 miles. From Maimana to Bala Murghab the routes appear the same, and agree in distance, Ferrier making it 100, and Grodekoff 101 miles. To Kala Nau the routes differ altogether, the Russian route passing by the Derbund Pass and Darra-i-Bam, and Ferrier by Karnachi and Koh-i-duzd. Ferrier makes his distance 60 miles; and Grodekoff's estimate of 34 miles for this part of his route must therefore surely be wrong. From Kala Nau to Herat, Ferrier, by Anchara, Khush-i-zard, Band-i-zermast, and Kurakh, makes it 80 miles; while Grodekoff, by Khushk and Hazrat-i-Baba, reckons it at 66. The total distances are by Ferrier's route, 370 miles, by the Russian, 353; but there is reason to think that one part of the Russian estimate (between Bala Murghab and Herat), should be increased by about 20 miles at least, which would lead to a very close agreement in total distance between the two authorities. The nature of this route is sufficiently well described by both. Passing for the most part through a region of mountains, the road between Balkh and Maimana is level and good, with water supplies, and forage in abundance, and halting places at reasonable distances. To Bala Murghab, there is a good level road, passing here and there over hills of easy gradient, and always passable for guns. To Kala Nau the road continues level and good, but water and supplies seem not quite so abundant. From thence to Herat, the Band-i-zermast forms the only difficulty, the ascent being stony and steep. Along this route, Usbegs, Tajaks, and Eimaks would undoubtedly give far more trouble than the Turkoman hordes farther north. The Hazaras of Kala Nau, and the Eimaks of Bala Murghab are a fighting people, and there can be little doubt that the strong objection to this route as a Russian line of advance lies in its geographical position in Afghan Turkestan, peopled by warlike tribes almost from end to end, who hold large semi-fortified towns, and are strong especially in cavalry. It would be a most troublesome line to hold, involving large garrisons at frequent intervals. Between Charjui and Merv, the local resistance would be of that spasmodic, fitful kind which is generally offered by nomadic Turkoman horsemen, and which will never prevent the advance of a well equipped and disciplined force. At Merv itself, the Akhal Turkomans who hold it are known to be a fighting and independent tribe, who might be troublesome foes to deal with; and yet in spite of the directness of the Balkh-Maimana route, it is to the Charjui and Merv line in conjunction with the lines from the Caspian lines beyond the reach of Persian, Afghan, or British interference, that we must look for the first appearance of the Cossack; not indeed in the advanced

guard of an army prepared to make its way through the mountain defiles of Afghanistan for the invasion of India, but as heralding the slower but surer advance of Russia's boundary and Russia's influence southwards, patiently and persistently consolidating power, and securing good communications with every mile of country gained. But a look at the distances of Herat from Russia's present bases, combined with what we know of the natural obstacles to be encountered along them, will surely be quite sufficient to dispel any lingering doubts as to the chances of a rapid and sudden descent on that place.

From Krasnovodsk to Herat *viâ* Sarakhs and Merv .. 700 miles.

From Bokhara to Herat *viâ* Charjui and Merv 500 "

From Balkh to Herat *viâ* Shiburghan and Maimana.. 370 "

On the other hand, Kandahar is 370 miles from Herat,¹ which it will be observed is just about equidistant with Balkh, at which place the intentions of a force acting southwards from Bokhara would first become apparent. Of the two routes it is probable that that from Balkh to Herat is considerably the easier, but the opposition along it would be greater. It is clear then that it becomes a matter of great importance to us under any circumstances to have full information as to what passes at Balkh. If we put Sarakhs at 200 miles from Herat, and Merv at 250, recollecting at the same time that there can be no great natural obstacle to be encountered in an advance along either of these lines (in spite of what irresponsible Russian newspapers may say on the subject) it seems to be abundantly evident that a Russian occupation of Merv is a very distinct menace to Herat. But the precise effect of menacing a point still between 700 or 800 miles distant from the nearest point of our Indian frontier, with not only a rough country of mountain passes and defiles, but a fortified position at Kandahar, and a standing army yet to be encountered between them, is just what seems most to perplex our ablest strategists and politicians to foretell, and is much too large a subject to enter upon here.

So far, we have assumed that the strategy followed by Russia so far in the slow and steady advance of her frontier (contrary to her inclinations as her friends assert, but necessitated by force of circumstances), is the same as that which she will continue to follow in future. She has not yet reached the Oxus, but she has made her influence paramount in the trans-Oxus regions. Nothing but Treaties or State obligations can prevent her reaching the Oxus, and securing a base from which her Tashkend army can act in conjunction with the army of the Caspian with the best possible effect.

From the Oxus and the Caspian conjointly, the same force of circumstances may lead to the occupation of Merv, and up to this point her progress must be slow even if it is sure.

But from this point it will be necessary to study the lessons we have learnt during our campaigns in Afghanistan, one of which certainly seems to be that, whereas the occupation of a line of communication

¹ Kandahar to Girishk, 75 miles; Girishk to Farrah, 152 miles; Farrah to Herat, 144 miles: 371 miles.

and of strategical positions (especially in Northern Afghanistan) is a matter of grave difficulty, and perchance danger, and stirs up the enmity of our Mahomedan foes to its fullest and bitterest extent, yet it is possible for a well-equipped force (content to abandon communications and to subsist on the country), to march from end to end of Afghanistan, easily overcoming such opposition as can be hastily arrayed against it, with tolerable certainty and precision. Moreover, Russia could use her forces in this way for purposes of concentration on such a point as Herat for instance, though hardly for a final invasion of India. To invade India, she must surely hold both Kandahar and Kabul, and strong lines of communication with the Caspian and the Oxus, and the day is yet very far off ere her Central Asian resources will admit of holding either without our full consent.

The occupation of Kandahar should at least lead to useful geographical results from the advantages it possesses as a base of exploration in countries where the presence of explorers would still be tolerated. Not at present, at any rate, is it possible for Europeans to travel in the Pathan districts of Afghanistan, or even in Afghan Turkestan with any degree of safety; but there are very large districts inhabited by Parsiwans, who have always been well disposed towards Englishmen, and it happens to be those districts which offer by far the widest field for geographical exploration. Kandahar is very conveniently placed with respect to that vast mountain region held by the Hazaras and Eimaks between Kandahar, Herat, and Kabul, about which we know so little, and which may yet prove to be of the greatest possible importance to us. The Hazaras claim to be a Turkish race, and are said to be Moguls descended from the army of Zengis Khan, which was located in the districts they now occupy. They are Shiah Mahomedans, and consequently opposed by religious prejudice to the bordering tribes of Ghilzais, and the Kohistani Tajaks. They are split up into numerous sections, probably numbering 150,000 souls in all. In personal character they are light-hearted, immoral, hot-tempered, and capricious; good riders, but bad fighters *en masse*, although courageous individually. Their close similarity of character and feature to the Ghoorkha leads to the conclusion that they must be of the same original stock, and, like the Ghoorkhas, they would probably prove good soldiers under European leaders. Their country is all mountainous—cold and inhospitable, varying from 15,000 to 5,000 feet above sea-level. There is little cultivation and nothing apparently to support an army in Hazarajat. The Eimaks are Sunnis, but otherwise very similar to the Hazaras. The interest in this country is not entirely geographical. These are the people on whom we should first lay hands to turn into valuable auxiliaries as native levies. Such material as this to assist in holding our advanced posts would indeed be valuable when properly trained and disciplined. Even without discipline, the Hazaras have in all recent engagements held their own very fairly with the Ghilzais, who are better trained and better armed in every possible way. Two routes are known to exist through their country, between Herat and Kabul, but information about them is exceedingly meagre and vague.

Friday, June 25, 1880.

ADMIRAL FANSHAWE, C.B., in the Chair.

NAVAL PROMOTION, ARITHMETICALLY AND HISTORICALLY CONSIDERED.

By J. K. LAUGHTON, M.A., Mathematical Instructor and Lecturer in Naval History at the Royal Naval College.

THE interest which attaches to the subject of naval promotion is by no means merely personal, or even technical; it belongs equally to everyone who has the good of his country at heart; for it directly affects the well-being of that service which has been pronounced in repeated Acts of Parliament—"the wall and fence of the Kingdom." It is on our Officers as much as on our men that the strength of the Navy depends; and their increased efficiency is of at least as much national importance as an extra inch or two of iron on the sides of our ships, or a few additional foot-tons to the striking energy of our shot. In the present mechanical age, there is little danger of these material points not receiving their proper share of attention; and ships, armour, armament, and tactics have, within these last few months, been repeatedly discussed in this theatre. On the present occasion I ask your attention to what is, after all, the soul of the machine; and propose to put before you an examination of the historical conditions of the active list of our executive Officers. If, as I have frequently maintained, the study of our past history has an important present value, it is that the correct knowledge and appreciation of what has been done in years gone by may lead to an insight into what has to be done now, or in the future; and that, not only in the domain of tactics, but of organization and of discipline.

I have thus no intention of serving up to you a *précis* of Blue Books and Orders in Council. There are probably many here who know quite as much about these as I do; and those who do not, may at their leisure read and digest—it is a sort of reading that takes a good deal of digesting—the several Parliamentary Reports, beginning with that of the 26th March, 1840. It is enough for my present purpose, to remind you that all these Reports recommend, all these Orders in Council insist on the more or less compulsory retirement of Officers from the higher grades of the Service, as the only way of obtaining a moderately rapid flow of promotion, and of keeping the active list within some moderate limit of numbers. The retirement of 1870, though more extensive and more rigid, did not introduce any new system; and though the temporary scheme of 1873 was, to some extent, novel in its details, it was still based on the same principle—that of retiring the senior Officers; in some cases voluntarily, in some cases compulsorily; but at any rate, of retiring them.

I have every reason to believe, that this fundamental idea of retirement, approved and acted on by several different Governments and Boards of Admiralty, quite irrespective of party; I believe, I say, that this idea was also generally approved by the Service at large: it was essentially the idea put forward by Sir John Hay's Committee in 1860; and I have frequently heard Officers speak almost affectionately of the retirement scheme of 1870; and still more of that of 1873. There is no doubt that the immediate action of these was to give a remarkable impulse to promotion; and, by reason of the great and sudden reduction of the lists, to cause a concentration of the Service calls, and almost a superabundance of appointments. But this could not last, and did not last; and the only thing about it that I see to wonder at, is that so many men did really expect that it would. I am by no means sure that there are not many who think that the change of the Ministry in 1874 had something to do with the failure, and hope that this other change, in 1880, may set it all right again. It seems to me rather the necessary consequence of the system adopted. If at any one time the old Officers are all retired, and the lists filled up to their complement with young, or comparatively young men, it ought to be needless to point out that nothing but "a bloody war, or a sickly season," can have much effect on these lists for many a long day. And meantime, promotion in the junior lists stagnates; the Lieutenants run on to fourteen or fifteen years; and the Sub-Lieutenants to five or six. This stagnation is peculiarly a grievance of the present time; and I believe I am right in attributing it to a reaction from the extensive retirement of seven years ago. By and by, there must, in the course of nature, come a time when the promotion will quicken itself, which will again be followed by a period of stagnation.

Now this stagnation, as I understand it, is a very disheartening thing. As the years pass over an Officer's head, there seems to be no escape from it. According to the system of promotion, virtually by seniority, which has continually gained ground, and which in the absence of distinguished service is probably the best that can be devised; according to the system of retirement, which has been adopted with such general approval, I must say that, for myself, I see no help for it. If a Lieutenant, of say twenty-three, has to wait for his promotion till a Captain of forty retires at fifty-five, or an Admiral of—say fifty, grows old and retires at sixty-five, it does not need an accountant to tell you that he will be thirty-eight before he is made a Commander. This is the present, and peculiarly the present view of the case. But there is another which inherently belongs to it, and has belonged to it for the last eighty or ninety years; and that is, that the number of Lieutenants so far exceeds that of Commanders or Captains, that, from the very nature of numbers, there is no present or future possibility of promotion for a very great many of them—just at present for seven out of every nine; and in past years for a still greater proportion.

Now this disproportion has, to a greater or less degree, always existed, and has always been a source of grumbling and discontent. To each individual the evil becomes a personal one; and he is unable to take a calm and philosophical view of the inexorable rigour of

arithmetic. In some form, and to some extent, the evil must continue to exist; and Captain Colomb perhaps suggested the only efficient remedy when he proposed that a comfortable retirement should be open to Lieutenants of ten or twelve years' seniority; a temptation, in fact, to the less hopeful, less earnest, less energetic, less ambitious, to withdraw from the race, and seek some other career.¹ But this is, evidently, a very different thing from compulsorily clearing the lists, or offering a *bonus* to the youngest and most energetic to go. Against this, Captain Colomb's opinion, as you all know, was very decided.

Our forefathers had, however, an entirely different way of meeting the difficulty; and their method of officering the fleet, though in many respects objectionable, was not perhaps so utterly bad as we are now apt to consider it. It is to this, that I wish more particularly to draw your attention.

In very early times, when our Navy consisted simply of such ships as were "arrested" for the King's Service, the executive Officers were not, in any sense, sailors; they were simply soldiers put on board to command the fighting men. From the Admiral downwards, they were all of the same class. The master of the ship was of a different degree altogether; in peace, he commanded the ship as a merchantman; in war, he was merely as a guide, to take the ship where he was ordered. We may imagine that many masters did stand out above their fellows, and, by greater boldness, courage, skill in manœuvring, and intuitive tactical knowledge, win for themselves a position above their recognized status; but the ordinary master of a ship in time of war held a very humble office. His pay, in the time of Edward III, was the same as that of an archer—6*d.* a day; a seaman's was 4½*d.* But at this time the ship was, in herself, not an engine of war; the fighting was done by bows and slings, at a little distance; by stones out of the tops, by sword, spear, or battle-axe, at close quarters. The Captain, then, was a soldier; his command was but a small one, for the ships were very small, and his rank corresponded; he was accordingly a man-at-arms, and his lance bore a single-tailed pennon, which modern custom has lengthened into the established pennant. His superior officer, a knight, commanding, afloat as ashore, a small party of men-at-arms, wore a swallow-tailed pennon, which, later on, came to be known as the distinguishing flag of a Commodore, in the same way that the square flag of a knight banneret has become the flag of an Admiral.

The Commanding Officer of a ship of war was thus, in his origin, of very humble rank, and his connection with the Navy was of the slightest. It was only as navigation and shipbuilding improved, and the ship herself, carrying guns, became the important tactical engine, that the advantage of the Captain being himself a sailor was fully recognized; and even when not one by early training, he not unfrequently became one, so far, at least, as to be able to exercise proper control over the master. And this was the state of things in the

¹ "Speculations on Naval Retirement;" by Captain P. H. Colomb, 1873.
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glorious days of Queen Elizabeth. Many of the most distinguished Captains and Admirals—Drake, Hawkins, Frobisher—were genuine old salts; others, again,—Grenville, Raleigh, Seymour, Howard, Cumberland—had a less thorough technical training, but were still capable seamen and experienced Officers; and, between the two, the post of naval Captain increased in dignity and importance. The ships were bigger; the men were more numerous; the rewards to be won from the Spaniard were considerable; and a service that had crushed the oppressor of European liberties might well claim for itself a proud position. But this, and the adventurous spirit of the age, naturally brought more and more volunteers to the fleet; men of family aspired to commands, and were not always willing to serve, in the first instance, in a subordinate capacity. Such cases were, however, exceptional; it came to be understood that the Captain of a ship must have some experience, and it was apparently to enable him to gain that experience that the rank of Lieutenant was instituted towards the end of the reign of Queen Elizabeth. The Lieutenant was thus, in his origin, neither necessarily nor probably a seaman; he was most likely entered from the shore in that capacity; a volunteer, to learn what seamanship he could, to assist the Captain in the command of the men, especially in action, but not to interfere in the navigation of the ship, which remained in the hands of the master.

Sir William Monson, at once a man of family and a seaman, tells us:—

“A Captain is to make choice of his Lieutenant; and it is as necessary that he be a man of experience, as himself; and though no such Officer be allowed in His Majesty’s ships but of late, and that the master repines to have a Lieutenant above him, yet do I hold it fit to have a Lieutenant, and he to have entertainment from the King, as well as his allowed shares in a private ship of war, for these reasons:—

“A Lieutenant is an employment for a gentleman well bred, who knows how to entertain Ambassadors, gentlemen, and strangers, when they come aboard, either in presence or absence of a Captain. A Lieutenant is to be sent on a message, either aboard ships or ashore, upon any occasion of service, though it be to great persons, an unfit employment for a master. A Lieutenant knows how to use gentlemen and soldiers with more courtesy and friendly behaviour, and will give better satisfaction than any other mariner or master can do, who have not been bred to it, but in the rude manner of a mariner.”—¹

And a good deal more to the same purport.

We have here, then, a pretty clear idea of what a Lieutenant was, when the rank was first introduced into the Service. He was appointed as of an entirely superior grade; superior to the master; superior to the warrant officers; and such he has always continued. He might or might not be a sailor; he might or might not be a gentleman; but he was always, from the first, recognized as an Officer of rank. The Captain was still more so; and though perhaps during the pacific reigns of James I and Charles I his social status was less brilliant, he was more commonly an Officer of skill and experience.

During the Commonwealth, a certain backward step was taken; the Parliament distrusted the naval Officers, and appointed a number of soldiers to the higher commands. Blake and Monk were soldiers

¹ Naval Tracts, in “Churchill’s Voyages,” vol. iii, p. 299.

pure and simple; Bourn, Deane, Rainborough are said to have been seamen in their youth, but they were appointed solely as tried and trusted partizans. The minor commands were not interfered with; the junior Flag Officers, the Captains and Lieutenants were seamen; and in the plain business-like time of the Commonwealth, seamanship and merit gave the best claim to command and to promotion. Fifty years later the seamen looked back to the good old times of the Parliament, when wages were paid in cash, and ships were commanded by sailors. In the time of Charles II things were very different; wages were not paid; and the appointment of the Duke of York to an active command in time of war, rendered the Navy fashionable, and sent many of the young nobles from the Court to the fleet. On the 16th June, 1665, Mr. Pepys tells us, "the Court is full of the Duke and his courtiers, "returned from sea; all fat and lusty and ruddy by being in the "sun." Not all; Lord Falmouth was killed on board the "Royal "Charles" by a shot that shattered his head,—

"And gave the last first proof that he had brains."

Two other volunteers, Lord Muskerry and Mr. Boyle, were killed by the same shot; and many others found that fighting the Dutch was no mere holiday amusement. But of those that returned, such or similar experience was held to warrant their being appointed to a command; and, during the remainder of that war and of the next, several ships were commanded by young courtiers who had, at the outside, served a few months as volunteers. This was not the worst. It was found that the command of a ship in time of war, or even in time of peace, might be lucrative. Pepys tells of a man who, "in one "voyage went out a volunteer, got to be a Lieutenant, then a Captain, "and, above all, got 10,000*l.* in money."¹ This was about 1680, and the money would seem to have been got partly by prizes from the Algerines, and in great part by carrying treasure, which was at that time fully permitted. The pay in itself was by no means bad, and accidental pickings could swell it considerably; when there were no prizes to be plundered, no treasure or merchandize to be carried, money might still be made in a dozen shady ways—from the provisions, slops, and ships' stores. The Captain and Purser, acting in concert, had great opportunities, and the Captain claimed the lion's share of the spoil. The extent to which this infamous traffic was carried seems now almost incredible, but it is fully substantiated by hosts of contemporary witnesses.² To men of no principle, the command of a ship was a chance not to be lost, and the needy hangers-on of the Court contrived to get many of the appointments. On this point, also, there is a general agreement of evidence from very opposite quarters. An old seaman of the Commonwealth—one of Oliver's men—writing in the time of Queen Anne, bewails the ill effects of—

"The raising of men to be Officers and Commanders from letter-men, as they "call them—a practice introduced by King Charles II, on pretence of recommend-

¹ "Life, Journal, and Correspondence," vol. i, p. 301.

² Amongst others, see "The Three Establishments concerning the Pay of the Sea "Officers" (1705), pp. xvi, xvii.

"ing by his letters the sons of the nobility and gentry to be bred up for command on board the fleet, which at last were obtained for coachmen, footmen, and the relations and friends, and sometimes stallions and bastards of lewd women who had interest at Court; or other mean and dissolute persons procured such letters for money, which quickly filled our fleet with the worst of men for Officers; and their contagious example soon infected the seamen, and made our fleet a sink of all wickedness."¹

And Pepys, who in his "Diary" frequently refers to the shortcomings of the new Captains, as compared with the old, speaks still more plainly in his journal of a voyage to Tangiers:—"These gentlemen Captains," he says, "depending on the interest of their friends at Court, will venture to do what a plain tarpaulin, if he had no other reason, would never dare." And again:—"The instances of Captains giving up their whole care to profit themselves, and not the King's service, are infinite."²

In this way there was in the Service, in the latter part of the seventeenth century, a very curious mixture as Officers: some seamen, some not; and this, not only as Captains, but also as Lieutenants. Of the ill effects of it, there are many historical proofs; the most familiar being the quarrel between Vice-Admiral Benbow and the Captains of the squadron in the West Indies, which culminated in that disgraceful action with Du Casse. And such quarrels were not only between Captains and their superiors. Men new to the sea, and perhaps of a higher social rank than the old salts, looked down on their humbler shipmates, and treated them with contempt and cruelty.

"The warrant officers," writes Purser Maydman in 1691, "live more like dogs, I mean spaniels, than men: for he—the spaniel—by nature fawns on him that beats him: so ought a warrant officer to do if the cane of the Captain comes over his shoulders; there is no better remedy than to be like the spaniel. Nay, I am much mistaken if Lieutenants scruple to strike a warrant officer, and that upon slight occasions."³

That in this way, the position of Captain or of Lieutenant was often much abused, seems clear enough: but even without such abuse, the mere fact that these Officers were not unfrequently of high social rank gave to the service-grade a certain reflected splendour, and tended to increase both the authority and the power. The Captains (autocrats by the necessity of the Service) ceased to have that community of feeling with those below them, which they had had in the more plebeian times of the Commonwealth, or previously. At an humble distance, the Lieutenants, following their example, also separated themselves from the inferior Officers, and formed a distinct class on board ship, which those below looked up to, or envied. And those below were mere nobodies. The Lieutenant was the lowest grade recognized as an Officer. The warrant Officers, who had been all-important, were relatively degraded: the Boatswain, the Gunner, and the Carpenter were left altogether behind; and though the Master, the Purser, the Surgeon, and the Chaplain, asserted their claims to something like social equality, it was only by slow degrees that they made them good.

¹ "An Inquiry into the Causes of our Naval Miscarriages (1707)," p. 12.

² "Life, Journal, and Correspondence," vol. i, pp. 351, 399.

³ "Naval Speculations and Maritime Politicks," p. 207.

Even as late as the middle of last century, the Lieutenants seem to have exercised supreme control over the ward-room, and at their mere will to have ejected their messmates. Many of you will remember that very curious "Chaplain's Petition," first published in the "Gentleman's Magazine," in 1758, which illustrates a remarkable phase of ward-room discipline.

Notwithstanding this, the pay of a Lieutenant was very modest. Up to 1693, it was 3*s.* a day in First or Second Rates, and 2*s.* 6*d.* in all others. This was, of course, worth a great deal more than at the present day; but even when they got it—which was by no means always—it compared poorly with the pay of a Captain, which, with allowances of one sort or another, amounted in a First Rate to nearly 800*l.* *per annum*. Previous to 1686, a Captain was authorized to carry freight when it offered; but this led to such gross abuses that it was forbidden under stringent penalties, and a table money, ranging from 250*l.* in a First Rate, to 83*l.* in a Sixth, was substituted. He was allowed, besides this, the privilege of entering servants, in the proportion of four out of every 100 of the ship's company. These servants might, or might not, have any corporeal existence. The order against signing a false muster-book was, indeed, always in force: but it was probably recognized that a Captain's servant might be absent on the Captain's business; and, as a matter of fact, many of them were, as far as the ship was concerned, mere names; whilst others were entered with the customary understanding that they were to serve for their lodging, their ship's provisions, and what wages their master liked to give them; whilst he took to himself their ship's pay. This was the rule of the Service: it was supposed that the Captain could, in this way, bring many respectable lads into the Navy and make sailors of them; no doubt he frequently did; but the money always. It was estimated at about 10*l.* a head, or in a First Rate, 240*l.* a year. About the year 1690, the pay of the Captain of a First Rate was—

	£	s.
Pay	273	15
Table money	250	0
Servants	240	0

£763 15

exclusive of any illegal and unrighteous perquisites and pickings. This, in mere reckoning, was not so widely different from a Captain's present pay, which, with command money, amounts, in the highest rates, to 930*l.* 15*s.*; and was, in reality, worth a very great deal more. During the war in the reign of William III, the sea pay of all Officers and men was doubled; but as, at the same time, the number of servants allowed to a Captain was reduced to reasonable limits, a Captain's pay was not much increased. The Captains therefore raised a great outcry; asserted that they were actual losers by the double pay, and insisted on having their full number of servants. Accordingly, in 1700, their servants were given back to them, and the sea pay was "retrenched," that is to say, from one to two-thirds of the late increase

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exclusive of any illegal and unrighteous perquisites and pickings. This, in mere reckoning, was not so widely different from a Captain's present pay, which, with command money, amounts, in the highest rates, to 930*l.* 15*s.*; and was, in reality, worth a very great deal more. During the war in the reign of William III, the sea pay of all Officers and men was doubled; but as, at the same time, the number of servants allowed to a Captain was reduced to reasonable limits, a Captain's pay was not much increased. The Captains therefore raised a great outcry; asserted that they were actual losers by the double pay, and insisted on having their full number of servants. Accordingly, in 1700, their servants were given back to them, and the sea pay was "retrenched," that is to say, from one to two-thirds of the late increase

was stopped: a manifest gain to the senior or more influential Captains; but to the junior Captains, and still more to the Lieutenants, a very palpable loss. According to this, a Lieutenant's pay was fixed at 5*s.* in First or Second Rates, and at 4*s.* in all others; and so it continued throughout the century. It was not till 1796 that it was partially increased by making it a uniform 5*s.* in all rates, with an additional 6*d.* in flag-ships. A shilling was added to it in January, 1806; I believe as a sort of bounty for Trafalgar; and in 1816 it was further advanced to the curious sums of 9*l.* 4*s.* a month; to First Lieutenants of more than seven years' standing, 11*l.* 10*s.*; and 6*d.* a day extra in flag-ships. I have called these sums curious, because they are not even money, nor will they give even money as a day's pay, or a year's: referred to our usual daily standard, they are a fraction more than 6*s.* 6*d.* and 8*s.* 2*d.*

In 1840, on the Report of a Royal Commission which had been sitting for nearly two years, the pay was raised to 10*s.*, with an additional shilling to First Lieutenants of more than seven years' seniority; and at that 10*s.*, to the great body of Lieutenants, it has since continued. Considering the enormous depreciation in the value of money since 1840, it would seem to be nearly time for the question of Lieutenants' pay to be again re-considered. But this, unfortunately, is not a question for the Admiralty, who know what a Lieutenant's work and expenses are: it is rather a question for the Treasury, whose first rule—I am told—is to say No! to whoever asks for money. The following table will show succinctly the changes of which I have been speaking:—

Lieutenant's Pay, per diem, as established.

	<i>s.</i>	<i>d.</i>	
Prior to 1693 ..	2	6	3 <i>s.</i> in First or Second Rates.
In 1693.....	5	0	6 <i>s.</i> " "
1700.....	4	0	5 <i>s.</i> " "
1796.....	5	0	Same in all Rates;—6 <i>d.</i> additional in Flag-ships.
1806.....	6	0	6 <i>d.</i>
1816.....	6	6	8 <i>s.</i> 3 <i>d.</i> (if " First Lieutenant and of 7 " years' seniority); 6 <i>d.</i> additional in Flag-ships.
1840.....	10	0	11 <i>s.</i> (if First Lieutenant and of 7 years' seniority); the Flag-ship pay abolished.

These rates of pay, in themselves sufficiently low, were, until comparatively lately, made still lower by the difficulty of getting it. I need not now speak of the state of the Service in the reign of Charles II, when—on system—no one was paid, except the higher Officers under Government, who could take care of themselves. But quite independently of that irregularity, it long continued to be the rule for Lieutenants not to be paid until their ship was paid off, and they had passed their accounts. It was not till 1745 that they were ordered to be paid yearly, "on producing the proper certificates that they have delivered their journals into the proper office, that they have behaved

"like Officers, and complied with the General Printed Instructions." And this was only granted after a very strong memorial setting forth the hardships they—the Lieutenants—had to undergo in consequence of the then system of paying; for in time of war, it is—they said—almost impossible to get credit or to borrow money except at a most ruinous interest, amounting sometimes to cent. per cent.,—"insomuch that they cannot live nor appear with decency and like gentlemen;" that the changing of ships, and the fitting for different voyages, by "obliging them to equip themselves in a different manner," is a continual source of expense; "that as they attend all duties, execute all orders, and upon all occasions are the immediate messengers of despatch and trust, they are liable to many hardships and great expenses in the execution of the services on which they are sent; which services almost always require them to be dressed like Officers of His Majesty, and to have money in their pockets to defray the many contingencies that happen; to supply which, they are compelled to take up money at exorbitant interest."

It is thus, perhaps, not to be wondered at that those who had not private means, were most commonly not dressed either like Officers of His Majesty, or like gentlemen. May I recall to your memory the very well known description of one—Lieutenant Bowling? "His dress—we are told—consisted of a soldier's coat, altered for him by the ship's tailor, a striped flannel jacket, a pair of red breeches japanned with pitch, clean grey worsted stockings, large silver buckles that covered three-fourths of his shoes, a silver-laced hat whose crown overlooked the brims about an inch and a half, a black bob-wig in buckle, a check shirt, a silk handkerchief, a hanger with a brass handle, girded to his thigh by a tarnished laced belt, and a good oak plant under his arm." This was the holiday get-up of a Lieutenant shortly before the first introduction of uniform in 1748, the pattern of which you may see in the Museum: but long after this, it was not unusual for the Lieutenants to have one uniform coat amongst them, which they wore by turns, as they had to go away on duty; whilst on board, they wore such old clothes as circumstances permitted, or suggested: a second-hand soldier's red coat being—it is said—that which came most frequently to hand. In many ships, of course, things were very different; in flag-ships more especially: but simply because the bulk of a flag-ship's Officers were of a higher social standing; and for those who were not, it was worth while, at any possible sacrifice, to hold on as a "follower" of the Admiral. I find for instance that towards the close of last century, say in 1796, on board—it would seem—the "Royal George," the ward-room mess-money was 5*l.* a month: and though this included a certain limited quantity of wine, and friends to dinner on guest days, it is still clearly beyond the means of an Officer whose income was limited to his pay of 8*l.* 5*s.* per calendar month.¹ That many Lieutenants had private means, were gentlemen of family and fortune, we know; many others, gentlemen of family but not of fortune, were dependent on their pay; and during the whole of the century, a very large number were—what we would now describe as—promoted from before

¹ *Naval Chronicle*; vol. xxxii, p. 237.

the mast. To this we must attribute the low standing of Lieutenants, as compared with their Captains. When the Captain came on board—even drunk, at midnight—all the Lieutenants were called on deck to receive him: when a Lieutenant spoke to the Captain on the quarter-deck, he stood before him, bareheaded. It is impossible to say how much of this was the rule, how much only occasional: but in 1779, a Lieutenant was tried by court-martial, for insolence and disrespect to his Captain before the ship's company; and the cross-examination turned principally on whether the Lieutenant had his hat on or off, and whether the Captain had ordered him to take it off whilst speaking to him. For the Officers to receive the Captain coming on board, or to attend on him leaving the ship, continued, to some extent, the custom of the Service within the memory of many now present.

As to subordinate Officers, such as we now know them, they can scarcely be said to have had an existence: master's mates and midshipmen were indeed petty officers; but their rank was humble, and their social standing, as such, was low. For them to be made Lieutenants, was a dream, the highest goal of the ambitious. Many, of course, succeeded, whether by merit, by gallantry, good-fortune, or by favour—not always of the most reputable kind. Mr. Pepys—for instance—has told us how, going home to his lodgings at Greenwich late one winter's night—"I was sat up for to be spoken with by my young Mrs. Daniel—the daughter of his landlady—to pray me to speak for her husband to be a Lieutenant. I had the opportunity here of kissing her again and again, and did answer that I would be very willing to do him any kindness; and so parted." In this instance, the kissing was not successful: Mr. Daniel was not made a Lieutenant. But the scandal-mongering chroniclers of the old Navy are grievously at fault if fair but frail advocates did not often obtain the boon they demanded; not only in the time of Charles II, but for more than a hundred years afterwards: perhaps even still later.¹

The low social standard of the greater number of midshipmen and master's mates continued throughout the eighteenth century. A comparatively small number of lads of good family served in these ranks for a short time, messing, not unfrequently, in the Captain's cabin; but these were promoted as soon as their family interest could manage it, and often much sooner than the rule of the Service permitted. This rule, steadily repeated in every succeeding edition of the Printed Instructions, was that none was to be preferred to be a Lieutenant who had not—amongst other qualifications—"served six years at sea," and was "not under twenty years of age." It is curious to note how systematically—when family interest urged—this rule was violated. The difficulty was apparently got over by having the boy's name entered on some ship's books, in any capacity—most frequently as a Captain's servant—years before he saw the sea; and in his examination, altogether ignoring the question of age. It is quite certain that, during the last century, many were made Lieutenants and

¹ See, for instance, "The Naval Atalantis" (1788); p. 21. As an authority for any matter of detail, the Atalantis is utterly worthless; but the scandal referred to could not have been invented, if the broad principle of it had been unknown.

Captains without either the sea-time or the age. I know of one who was born in February, 1765 : who went to sea for the first time in January, 1780 ; and whose name is on the list of Post-Captains, with seniority October, 1780. This is only one case : but though, perhaps, extreme in degree, I have no reason to believe that it was exceptional in kind.

Still more, probably, did honestly serve their time at sea, and were made Lieutenants on completing it : but by far the larger number of midshipmen and master's mates served simply as such, neither hoping nor expecting to rise beyond their rating, or looking to a lieutenancy as a possibility awaiting old age. They were entered for the commission only ; and were no further attached to the King's Service : they might have shipped from the merchant service, they might go back to it ; ready at any time to return to the Navy, if a favourable chance offered. Looking over some volumes of passing certificates, I find numbers of such entries as this :—

" We have examined Mr.—who by certificate appears to be upwards of thirty-five years of age ; and find he hath gone to sea upwards of eight years, part whereof in merchant service, to Guinea, Jamaica and the Leeward Islands, as appears by certificates from the Masters of the ships he served in ; and the rest of his time in His Majesty's ships undermentioned, in the qualities there expressed."—&c.

Others again refer part of the time to " the service of the East India Company, as appears by certificate from their paymaster." And the ages—when noted, in accordance with the instruction—have a very wide range, apparently at the caprice of the examiners : for whilst some are described as " more than thirty-five years of age," or forty, or fifty,—in one case more than fifty-two,—others, who are shown by their certificates of service to have been going to sea for thirty years or more, are simply stated to be more than twenty years of age.

Now these men whilst in the Navy—and as years went by, it came to be the rule that they must have served six years in the Navy, two of which in the rating of midshipman or master's mate—these men served in all conceivable ratings, according to circumstances ; as ordinary or able seaman, gunner's mate, boatswain's mate, quartermaster ; as midshipman or master's mate often in between ; and it must, as I said before, be borné in mind that, during the greater part of the last century, the midshipman was not supposed to be a gentleman, nor was his wife supposed to be a lady. When midshipmen were thirty or forty or fifty years of age, a married midshipman was naturally not very uncommon ; but Mrs. Midshipman was probably no better than the wife of any other seaman. There is a case on record of a midshipman hanged, in 1779, for murdering his mother, who had come on board his ship at Spithead, and had tried to make interest with the First Lieutenant to be allowed to attend the ship as bumboat-woman. When her son remonstrated with her on her taking such a step, as likely to lower him in the estimation of the Officers, she seated herself on a chest outside the berth, and poured forth on him and his wife all the abuse she could compass with a very foul tongue. The poor man, driven almost mad, made a push at her with a hanger that he caught up, more perhaps to frighten her than anything else ; but it

killed her, and he was found guilty of murder. The severity of the sentence is not the point to which I wish to call your attention, but rather the very distinct evidence the case affords of the social position of one who seems to have been a rather promising young midshipman.

There is another case of a midshipman hanged, also in 1779, for attempting to raise a sedition amongst the American and French prisoners that were on board his ship during her passage home from North America. The plot was to kill the Captain, Officers, and all who opposed them, and carry the ship into a French port. This man had himself been taken prisoner in an American ship, and had been allowed to volunteer for the service on the understanding that he was to have a petty officer's rating. And the greater number of midshipmen got their rating with as little regard to their antecedents; all that was looked to was their being capable petty officers. When the ship was paid off they went where they liked, or a pressgang dragged them; and certainly had, as a rule, neither claim to, nor expectation of promotion.

This state of things appears to have changed, almost suddenly, early in the War of the French Revolution; so many lads of family crowded into the service as volunteers, that the ratings of midshipmen were filled by them. This was not an unmixed gain: the quarter-deck petty officers were ignorant boys who had to be taught their work, instead of capable seamen who already knew it; and the old-fashioned Captains or First Lieutenants did not always consider the social improvement as a makeweight. We can fancy their disgust at having to teach them, in a body, the rudiments of seamanship; or the feelings with which a Captain is said to have addressed his young flock as, "My lords and gentlemen and you right honourable lubbers on the 'mizen-topsail yard.'" This quite expresses the evil of the change from one point of view; but, from another, it introduced a radically different feeling with regard to promotion. The "lords and gentlemen," whether lubbers or not, were by no means content to pass through life as occupants of a midshipman's berth: one and all they considered themselves entitled to be Lieutenants, and when Lieutenants to be Captains. Those who had family interest got their promotion; those who had not, growled in obscurity; but the numbers were unduly increased; the lists were enormously swollen, and for the first time there was something like a block.

In 1782, with 100,000 seamen voted, there were on the list 1,345 Lieutenants and 607 Captains and Commanders. In 1805, the number of seamen voted was 120,000, one-fifth more than in 1782; but the number of Lieutenants was 2,455, or very nearly double, and of Captains and Commanders 1,055, or an increase of more than 72 per cent. In 1812, the numbers had risen to 140,000 seamen and marines; Lieutenants 3,227; and Captains and Commanders 1,392; an increase respectively of 45, 110, and 113 per cent. on the numbers of 1782: or, counting them another way, in 1782 there was on the list one Lieutenant for every 74 seamen, and a Commander or Captain for every 165; in 1805, a Lieutenant for every 49 seamen, a Commander or

¹ Brenton's "Life of Lord St. Vincent," vol. i, p. 448.

Captain for every 114; and towards the end of the war, in 1812, a Lieutenant for every 45 men, a Captain for every 104. The very great and disproportionate increase is here sufficiently well marked; but it is not in this that the effects of the change of system most clearly shows itself. After the War of American Independence, when the armament was reduced, the vast numbers of subordinate Officers, master's mates or midshipmen, were simply paid off, the same as the men. We may suppose that the bulk of them found employment in merchant ships; others, young men of family, who had hoped to win a commission, but had not succeeded, went into such lines of life as their choice or circumstances dictated. I know of one who became a clergyman, of another who became a barrister; but whatever became of them, they were, for the time being, done with the service; probably many of them reappeared ten or eleven years later, when the French War began; but meantime the Lieutenants' list was not sensibly altered: there were but few promotions for the peace. In 1782, there were, as has been said, 1,345 Lieutenants and 607 Captains, including Commanders; in 1787, the corresponding numbers were 1,371 and 648. But at the peace in 1815 the case was very different: there was a large number of master's mates or midshipmen expecting and claiming promotion, many of them too with family interest powerful enough to demand it. The lists thus made a sudden jump. The Royal Commission of 1840 reported that 1,000 Lieutenants had been added in one year; and though many were at the same time superannuated, the lists were still enormously swollen. This is best shown in a tabular form:—

Comparative View of the Navy List, 1782—1818.

	1782.	1787.	1805.	1812.	1818.
Number of men voted.....	100,000	Peace	120,000	145,000	Peace
„ Lieutenants on List...	1,345	1,371	2,455	3,227	3,946
Ratio to number of men.....	1 : 74	..	1 : 49	1 : 45	
Number of Commanders and Captains.....	607	648	1,055	1,392	1,666
Ratio to number of men.....	1 : 165	..	1 : 114	1 : 104	

And just at the time that the lists were so swollen, the Navy was put on a peace establishment; few ships were in commission; and great numbers of these Officers were never employed in their new ranks. Further promotion was therefore necessarily slow, in the average; but it was extremely capricious: a young Officer who, by his family connections, by his personal merit or good fortune, attracted the notice of the Admiralty or a Commander-in-Chief, was pretty sure to be advanced rapidly; but without such very direct interest, he might end his days as a mate or Lieutenant. The Service was thus in great measure a lottery: to young men of good political or Admiralty interest, the chances were strong in their favour; to others they were often infinitesimal, but still they had an existence: some lucky acci-

dent might always bring them to the notice of the Admiral, and win for them an early vacancy. But it was found that of the small number of possible promotions, the greater proportion was in the hands of the several Commanders-in-Chief; very few remained for the Admiralty. This was considered unadvisable; and, bit by bit, the Commanders-in-Chief were deprived of the whole, or almost the whole, of their patronage. Court-martial vacancies were done away with; then invaliding vacancies; death vacancies followed; and the sole remaining fragment, the hauling-down promotion, was abolished a few years ago. Promotion now comes from the Admiralty alone, and is doled out with a uniformity of purpose that reduces every one to the same level. The element of luck is taken from it. In time of peace there is little opportunity for distinguished merit, and the Service becomes more and more nearly one of seniority. And no one is satisfied: the seniors are always out of humour, and the juniors have no special reason to be pleased with the turn of events. The average of promotion is probably quicker now than ever, but the iron hand of uniformity presses on all alike.

To administer any real remedy to this, without some very radical change in the present system is, I conceive, impossible. I am convinced that no system of extensive retirements, such as have been persistently advocated and experimented on for the last fifty or sixty years, can produce any lasting good. They may be very ingenious, but they all have a family likeness to those arithmetical puzzles which I hear little girls playing at, which seem to amount to—Think of a number, add ten, and subtract ten, and the number you thought of remains. So with the Navy List. You retire fifty old men, promote fifty young ones, and are surprised that the list stagnates.

Now the history of our Service, of which I have given you a brief outline, suggests a very different way of getting over the difficulty—a way, not an innovation, but a partial recurrence to the system of the past. I have pointed out to you that until, in round numbers, the beginning of the present century, the Service was largely officered, in the subordinate ranks, by men who had no expectation of, or even wish for, promotion; men who served for years contentedly as midshipmen or master's mates, looking forward to the possibility of being a Lieutenant, as the working petty officer of to-day may look forward to the possibility of being a boatswain; that of the Lieutenants also, a very large proportion were men who, having attained that rank, had no expectation whatever of rising beyond it. Some of them did indeed rise, but not many; though the number has perhaps been exaggerated in popular belief by the fact that such promotions have always been a favourite theme for the novelist. The incidents of romance might easily be paralleled or surpassed by those of history; but none the less these romantic promotions have always been exceptional: those who became Captains and Admirals were, as a rule, of a different social status, entered under different conditions, serving under different auspices.

Did this way of officering our ships answer? In some ways I believe it did; but its weak points were that some of the Lieutenants were too

old, and some were too young. The first does not seem to have caused any real difficulty; but the appointment of mere children as Lieutenants and Captains—in direct violation of the instructions—was a positive abuse which ought to have been remedied as soon as pointed out: that it was not, is only one more instance of the tenacity of abuses. On the 31st May, 1784, Admiral Sir Thomas Frankland brought the evil to the notice of Parliament, in very straightforward language;¹ and did perhaps prevent a repetition of the more glaring cases; but even during the Great War, there were several almost as bad as any that Sir Thomas Frankland had mentioned. Still, I believe that throughout the century, the average quality of our Officers in the junior ranks was excellent. Of the Captains and even Admirals, I would be inclined to speak less highly: I believe that many of them—not being seamen when they were promoted—never became seamen; having left school at an early age, never had any education; and were perhaps as nearly as possible on a par with the uncouth country squires that Fielding has described.²

Of course we don't want to go back to anything of this kind. The evils of it are too evident; and even if they were not, people in the present day are loth to admit the differences of social rank, and would assuredly not recognize any barrier, such as—in the last century—appeared insurmountable. Still I am not sure that something cannot be done on these old lines. We have resolved that aristocracy of birth or interest has no claims; is it impossible to substitute for it an aristocracy of intellect? to get together a body of Officers of the highest scientific training, and to let it be understood that promotion to the higher ranks is, as a rule, to be made from these only? I think this might be done; that our Service would be enormously more powerful, our higher Officers more capable, our juniors more contented. But it is a thing that would need doing: it cannot do itself.

To begin with, I think it would be necessary to take very decided steps to ensure a higher intellectual standard than is now attainable; and I conceive the first of these steps would be making the age of entry very much later than it is. I know it is commonly said that if a boy is not entered very young, he will not put up with the necessary hardships of a seafaring life. I must say I never could see the force of this argument: a lad of eighteen is hardier and stronger than a boy of fourteen, and will submit himself to discipline more cheerfully, as understanding and seeing the necessity of it. But the most common objection is, that if seamanship is not learnt in childhood, it can never be learnt at all; and this is repeated over and over again by numbers who, I am sure, have never taken the trouble to inquire into the facts. For it is within the experience of many, that men who have gone to sea comparatively late in life have become very first-rate seamen. I remember an old messmate, now an Admiral, telling me years ago, in discussing this very question, that the smartest captain of the foretop he had ever known had joined the ship in a smock frock, a raw

¹ "Parliamentary Debates," vol. xv. p. 52, *et seq.*

² For many instances in support of this, see Dr. Doran's "Mann and Manners at the Court of Florence," *passim*.

country lad of about twenty-two. And without dwelling on recollections more or less personal, I may remind you that in the whole range of our naval history, the one Officer who stands perhaps the highest in repute as a practical seaman, first went on board a ship at what he himself has called "the mature age for a midshipman of seventeen years and a half." I refer to the late Lord Dundonald. Lord Dundonald, I may be told, was a very exceptional man. Granted: but is it quite certain that he was not so, because he did not come to sea till he had been educated on shore; and thus brought into the Service, to begin with, not only a superior genius but a superior cultivation? The exceptional results of the exceptional conditions of his entry seem almost to suggest the advisability of trying them again.

And quite independently of this, I would ask if our young Officers, going to sea as they do, at about fifteen, get that early practical training which is held to be indispensable. I am led very much to doubt it. I cannot, of course, speak from personal knowledge; but I hear much that leads me to believe that the practical seamanship that a youngster picks up now-a-days is worth very little. His opportunities, such as they are, are subordinated to his school work. It is his watch on deck: he is excused and sent in to school. His boat is called away: he is at school, and must not be disturbed. The hands are turned up to exercise aloft: never mind the young gentlemen. Is not something of this sort the rule of the Service? I understand that it gets more and more so every day; and that, too, with diminishing opportunities. Under the most favourable system, an ironclad cannot be such a school of seamanship as a line-of-battle ship in the palmy days of the Mediterranean, the days of Sir William Martin, or of Sir William Parker. I know that some passing Captains have been supposed to act on the rule that a youngster, who has served his time altogether in ironclads, cannot have such a knowledge of seamanship as to entitle him to a First-Class. I knew one very promising young Officer—now unfortunately dead—who, as I was assured, lost his First-Class entirely on this account. On the other hand, the story reaches me that not very long ago, a young Officer who did get his First-Class, was casually asked, after his Examination was finished, if he had ever seen a ship tacked or wore; and answered that he had not. This, of course, was his misfortune, not his fault; and, constituted as the Examination is now, had, I conceive, nothing to do with his Certificate. But the possibility of anyone so obtaining a First-Class leads me to doubt, more than ever, the value of that early training which is gone through without even seeing the most common of nautical evolutions.

But if not for the seamanship, for what does the boy go to sea? His school might certainly be much better carried on on shore. Order it as you will on board ship, the routine will always interfere with it, and interruptions are frequent. Nor does keeping the middle or morning watch quicken a boy's faculties for study: with his eyes involuntarily closing, his head nodding over his book, the thermometer at 80° or 90°, and the perspiration dropping from the end of his nose,—the difficulties in his way are very real. What a make-believe

school, under such circumstances, often is, every Naval Instructor knows very well. The wonder is not that, with such a considerable expenditure of labour, so little is done, but that anything is done at all.

And the time of recreation—how is it spent? Certainly not in those games which English boys on shore most affect. Cricket or foot-ball can come but seldom: fives, racquets or tennis, still more so: a paper-chase is an event. And by some mischance, on these rare opportunities, a youngster's leave may be jammed: some boys have a special aptitude for getting their leave stopped: perhaps too, I might add, some Commanding Officers have a special aptitude for stopping their youngsters' leave. Am I wrong then in saying that a good deal of the time off duty is passed in sleeping—caulking on the lockers—to which a night watch and the sea air naturally conduce; with an occasional diversion—when the wine bills are good—in the way of cutting for a bottle of Marsala or a box of sweet biscuits?

Another objection to early entries, and one that seems to me a very strong one, is, that it is impossible to judge of the capabilities, bodily or mental, of the future man from those of the very young boy. Competitive examinations are little to the purpose. I believe that, to children, they are unwholesome, that they may easily become injurious; but my objection here is that they are useless. Of course, in a majority of cases, the best boy turns out to be the best man; the cadets at the top of the list on passing into the "Britannia," very often head the list also on passing out, and a few years later get First-Classes at the College. Still, there are very many exceptions. Everyone must have known children of the brightest promise, who have never realized it; everyone must have noticed how frequently the growth takes a start, or the intelligence of a stupid boy suddenly clears. The fact is, that at the age of puberty, the constitution passes through some sort of crisis, which often results in a very remarkable change; and until then, little can be said positively of the bodily or mental vigour.

There is yet another point which may be urged; one, too, of considerable, though not of paramount importance; that is, the very great expense to the country of the present system. Considerations of expense must, of course, in this matter be subordinated to those of efficiency; but my position is, that under the present system, the maximum of cost produces the minimum of efficiency. The expense of such an institution as the "Britannia" is enormous. With the necessary staff of Officers and men, it cannot be otherwise; but the result is, that the cost to the country, of each cadet on board, is little if at all short of 300*l.* a year. I am not prepared to say that little boys might not be taught the elements of algebra and trigonometry at a very much less cost. I am still less prepared to say that it is the duty of the country to pay anything at all for teaching these subjects to little boys. But putting these considerations on one side, the point on which I wish to dwell is, that owing in a great measure to the early age of entry, the cost of each Officer to the country is more than doubled. At twelve years of age, a boy does not know his own

mind; probably has not a mind to know. He thinks, or his father thinks for him, that he would like to go to sea. By the time he is four-and-twenty, he—or somebody else for him—has possibly enough found out that he has made a mistake. Of those entered as now, the number that disappear from the active list is very remarkable. Death, of course, removes some: ill-health, family affairs, dislike, incapacity, bad conduct, weed out an enormous proportion; and this weeding-out is a very expensive process. I find, by comparison of the lists, that more than a half of the entries into the Service disappear within twelve years. I do not now ask what becomes of them; as far as the active list is concerned, they disappear. But the cost of them is an accomplished fact, and must be added to that of those who remain. Now the personal cost to the country of each young Officer, by the time he has passed his Sub-Lieutenant's examination, cannot be reckoned at less than about 800*l.*; thus :—

	£
"Britannia," two years	600
Naval Instructor at sea	100
College at Greenwich	100
	<hr/>
	£800

and if only half the number remain, it follows that the cost of each young Lieutenant is somewhere about 1,600*l.*

The gist then of what I have been saying is that I would suggest the necessity of doing away with the entry of children as naval cadets. I believe that young Officers, passed into the active Service at the age of eighteen, might have their capabilities tested by a real and severe competitive examination; and, at the age of two or three and twenty, might be subjected to such further examination as was found advisable. But it is needless for me to go into detail on this point. Our Chairman, with a wider experience, and more practical knowledge than mine, has already—six years ago—enunciated proposals which would serve admirably as the basis of any future discussion.¹ It is enough then to say that I believe, by some such course, a body of Officers trained to the very highest pitch could be got together; and I do not see that others, who failed of the required high standard, would—entering with a clear knowledge of the conditions—have any further claim on the country. They might continue in the Service; but except under special and peculiar circumstances, be out of the line of promotion.

I think that of Lieutenants so trained and qualified, from whom alone, under ordinary circumstances, all staff appointments should be made—who alone should be in the line of promotion—the number might be fixed comparatively low; at three or four or five hundred: probably the smaller number would be sufficient: and that this number might be supplemented to any necessary extent by those Officers who had fallen short of the high standard for the Staff, and

¹ "Suggestions on the Entry, Education, and Promotion of Naval Officers;" by Vice-Admiral Fanshawe, C.B.: 1874.

still more, I think, by Officers from the merchant service, who, under such conditions as might be decided on, would serve for a ship's-commission as Sub-Lieutenants or Lieutenants. Their doing so would give them wider experience in the command of men than they can possibly get on board merchant ships, and would, therefore, render them more efficient as Officers of the mercantile marine; and, on the other hand, their experience of the discipline and training of the Royal Navy would render them in fact, as in name, a Royal Naval Reserve.

Now I can see two objections which may be made to this. Firstly, that Officers so introduced for temporary service would fall short of that high scientific standard which is now an essential. I read continually in the papers that it is necessary for naval Officers to know as much mathematics and physical science as a Wrangler from Cambridge. This of course is utter rubbish; and I am glad to be sure that it is so: otherwise I should have to say that our Navy is in a very bad state: for I have the best possible means of knowing that few indeed of our naval Officers have any such knowledge of mathematics. I could wish that of these there were more. There are no doubt many questions of nautical science which cannot be resolved without a fair knowledge of mathematics; and we must have, amongst our Officers, a sufficient number of men equal to grappling with these, whenever and wherever they occur. But on the other hand, I can conceive the possibility of a Lieutenant keeping his watch, mustering his division, drilling his quarters, or in time of need, fighting them, and doing all the duties of an ordinary Lieutenant, in peace or war, without more mathematics than the multiplication table.

Secondly, I can conceive it being objected that the standard of seamanship is lower in the merchant service than in the Navy. I am not qualified to pronounce on this point; but I have heard it stated the other way; and I should like to ask the Captain of such a ship as—say—the “Northumberland,” or the “Alexandra,” or any other large ironclad, whether he would sleep more quietly through the middle watch, on a wild dark night, if the deck was in charge of a young Lieutenant, fresh from the gun-room and Greenwich, with all the glories of three ones; or of a Lieutenant of what we now call the Reserve, with five or ten years' experience as a watch-keeping Officer on board a Cunard or Peninsular and Oriental steamer. And independent of this, the Admiralty has recognized the capability of these Officers, by commissioning a number of them as Sub-Lieutenants and Lieutenants of the Reserve; by appointing several of them to the ships of the Reserve Squadron for a cruise—as was done eight or ten years ago; and by acknowledging them as a stand-by in case of war. If they are fit to officer our ships in time of war, they are equally so, to a smaller extent, in time of peace; and any such objection falls to the ground.

On the other hand, the suggestion seems to me to offer many advantages. It would—to begin with—prevent the block continually recurring in the Lists of the Royal Navy: it would improve the efficiency of the Reserve: it would be a commercial gain, by improving the efficiency of Officers of merchant ships; and it would be a national

gain, by bringing the whole seafaring interest of the country more into unison with the Navy, and doing away with much of that jealousy which cannot but be a source of weakness. It used to be our boast that we were strongest at sea, because we had more sailors than any other country: as our Navy is at present constituted, this great source of national strength is put altogether on one side.

In conclusion, then, I would suggest as a possible remedy for many of the difficulties which the state of the Navy List now presents:—

1. The establishment of a highly-trained body of Officers, who should occupy, efficiently, the place inefficiently occupied, in former days, by those favoured by birth or interest.

2. The recurrence to the system of permitting and encouraging Officers of the mercantile marine to enter, as Sub-Lieutenants or Lieutenants, for temporary service on board Her Majesty's ships.

Such a scheme may no doubt seem to many wild, Utopian, reactionary, retrograde. To me, it is one which the facts of our past history suggest; the facts of promotion unduly rapid, and the evils which attended it: the facts of a stagnant list, and the evils which still attend it: the facts of the employment of Officers from the merchant service, and the advantage which has resulted from it. It is as such, a suggestion of a possible solution to a very serious and important problem, that I now put it before you.

Captain S. LONG, R.N.: I did not come prepared to speak on the subject of naval education, or an easier road to promotion, but one or two things have occurred to me in connection with this subject, which I should like to state. I think that a later entry would be decidedly advantageous to the country; and with regard to promotion, I cannot but think that some such plan as is adopted in France ought to be adopted in this country, that is to say that the packet service ought to be the natural refuge for Officers who are either not highly gifted, or through misfortune can never hope to attain the higher ranks of the profession, but who would be well qualified to command packets. The country pays large sums for this service, and yet gains thereby no preparation for war whatever. I know perfectly well that there are many Officers in the Navy who would like the duty of commanding a packet running to and fro regularly between England and some other place. They would be glad of the emolument and the employment; but instead of that, when an Officer gets to a certain standing and age, and is not promoted, he is put on the retired list, a list which is annually attracting more adverse notice in the House of Commons as involving a considerable non-effective charge. I hope that when the Report of the Royal Commission on National Defences comes out, some well-considered scheme will be adopted for affording the country a sufficient naval reserve, and likewise affording employment up to a reasonable age to all Officers of Her Majesty's Navy.

Vice-Admiral SELWYN: I have paid some attention to this subject in former years, and I am sorry to say that I have arrived at conclusions diametrically opposite to those which Mr. Laughton has set before you. With regard to what Captain Long has said with reference to the practice in France, I have always pointed it out as the true solution of the question. Boys are taken into the French commercial marine, not as with us at the age of ordinary midshipmen, to be taught a great deal of evil, if anything that is good, but after having passed through four years in the national Navy, in which they learn discipline and self-control. Mr. Laughton has recommended that the entry should be later, and Captain Long has supported the idea. Now, why is it that a great number of fathers of families look with the greatest pleasure to their sons going to sea at an early age? First, because they are not at all satisfied with schools as they exist to-day, when a great deal more evil is taught than good. Unfortunately, even in the highest class schools, vices come to the surface which ought to be entirely absent, and which are absent on board ship, owing

to the constant supervision. Secondly, it relieves parents from a considerable expenditure on their boys during those early years. But largely I think it is because of the physical health given during those early years at sea, which is one of the most remarkable things that has ever been observed. A boy out of a family, not remarkable for health, goes to sea at the age of twelve or thirteen, and comes back four years afterwards the picture of robust health. His brothers, who have been at school or college, appear weakened by his side, and have not the same activity or health; and it is because this is widely observed and known that many of our highest families are anxious to have their boys go to sea, if only for that reason, and they are contented that they should afterwards leave the Navy for other employments. It is the best training by far as regards moral and physical strength, and as for the amount of knowledge obtained at sea, all I can say is, if anyone will compare a young midshipman who has come back from sea with a boy who has been at school, and will ask the two to take charge of anything to be done, the midshipman will always be foremost. He will know how everything is to be done. He will do it with a steadiness, shall I say with a manliness, which you never can find in the other, who has not been subject to the same discipline. For these reasons the training at sea has been regarded as the most valuable training that can be obtained in the country. That boys do not learn as much mathematics in those years as on shore I can only attribute to the fact that the majority of mankind are not meant to practise mathematics. The subject is very little understood, even by those who do practise it, as Mr. Walter Mitchell told us here. He acknowledged that he had put himself as a pupil under Mr. Oliver Byrne, who taught him, a professor of mathematics, in a few weeks more than he had known all his lifetime of calculation and mathematics, so that in fact he did not need to know anything more of what he had previously studied. I may also mention what Professor Sylvester said to me some years since, "The other day a gentleman came to me, a Wrangler 'from college; who wished to study mathematics. I said to him, 'What do you 'propose to do when you have studied the subject? There are six positions open 'for mathematicians throughout England. I occupy one of them, and I do not 'propose to get out of it just yet. What are you going to do? Are mathematics 'an absolute necessity to your work? Do you require them as a means or as an 'end? If as an end, *le jeu ne vaut pas la chandelle*. If as a means, the most 'useful mathematics will be those which you will practically learn in the pursuit 'of whatever profession you engage in.'" Engineers do not make themselves great names in this country because they become Wranglers at college, but because they are practical hardheaded men, who use as much mathematics as they want, and pay for what they have not got themselves. That is really the state of the case. All education is a preparation for the life that a person is likely to lead, and the best education for a man who is going to sea is a sea life. If our great mathematicians who build our ships had only gone to sea when they were young, instead of staying where they were in London, we should have had real ships, instead of things that turn upside down. Then let me refer to another point. If we try to amalgamate a service like our mercantile marine with the Royal Navy late in life, we shall find that we are engaging in a fallacy. The man who comes from the mercantile marine does not do so until he has passed many years of his life at sea in earning money, for that has been his object. He then comes to you without any of the special knowledge which a naval Officer ought to have at that age. He may be a very good seaman, but that does not make him a good naval Officer. Day by day the naval Officer is varying more and more widely from the seamen of the mercantile marine. I have made many passages backwards and forwards in the American liners. Now what has an Officer to do there? They have often told me themselves that practically all they have to do is to take a floating hotel from one side of the ocean to the other on a given line: about any other line they know nothing. Their compasses even would not take them a thousand miles out of that line without error. Then do they know anything of guns, or steam, electricity, or discipline, soldiering, or diplomacy? No, they are not trained for these things. Are these then the Officers to whom you would choose to commit the command of men who are brought up to the work? Certainly not. But if the British parent will give four years of his boy's life to the Royal Navy, he can then get such efficient schooling as I have no doubt

Mr. Laughton's profession will give him, and he will get it in a much better school, with more gentlemanlike associates, and he will not come into the mercantile marine as a young man with very little principle, and less power of self-control. I am sorry to say that all our returns from Consuls abroad show a considerable contrast between our mercantile marine and that of the French. I fear that from the Consular reports from different parts of the world to which our commerce goes, that in the case of small sailing ships the Captain is too often drunk when in harbour. He thinks that he has done his work when he has taken his ship from one place to another, and there appears to be the same feeling unfortunately among the crew. With our great steam mercantile marine this cannot occur, because their men are better disciplined, better educated, and remain longer in one employ. If the system I have mentioned were adopted, we should have a true naval reserve on which we could rely. The mercantile marine are supposed to be a reserve, and so they would be, if they could be trained to the use of 32-ton guns with proper carriages, in the way that our own people are trained, with Martini-Henry rifles, and every other appliance, and gave in every respect the same time to the same work, and if their Officers were accustomed to go to engineers and learn from them how to construct and manage the steam-engine, the electric telegraph, the torpedo, and received in every way the same instruction as the Officers of the Navy. But this would really amount in every way to an increase of the Navy, not to a delusive substitution of one service less highly trained for another which is more so. I do not agree with Mr. Laughton that any recurrence to the interesting state of things which he has described would do us any good. We do not want an alternate opening of the door to more midshipmen than are needed for the Service, and then a sudden closing to obviate the effects of it. What Mr. Laughton has pointed out is the result of that very practice which has been adopted for centuries past. If on the occurrence of war or from any other cause, a great number of midshipmen enter the Service, they must go forward to be Lieutenants some time or other. Then in after years they fall upon the profession in a miserable necessity of promotion, and in order to make up for this miserable necessity you have retired lists. Now what have those lists been? Mr. Laughton has pointed out that they have been failures and mistakes, that they have succeeded in discontenting a great number of persons, but that they have not led to the benefit they were supposed to promise, except for a short time, and that they will not do so in future. We still appear to ignore the fact that a neighbouring nation, with a navy almost equal to our own, conducts its business on an opposite principle and succeeds. We must look at the matter in two ways, not merely as persons who have an interest in the Navy, but as trained men who have cost the country so much money to train. We are now reduced to a state in which we have no broad choice that will enable us to fit out squadrons for every part of the world, and to officer and man them properly. You can no longer do it, and it is only to be done in the future, not by injustice to anyone, not by making favourites of any, but by entering no more than will probably be required to go forward, and by making up those who are needed in the lower ranks by training a large number of young Officers, for four or five years, who will afterwards go wherever they are wanted. For every Captain I suppose you ought to have about six Lieutenants, and for every Lieutenant about ten midshipmen, to conduct your business properly, making up those younger ones by training young men to go into the mercantile marine, or into any other line of life requiring the qualities which that training can impart. I know at present it is the fashion to give young Sub-Lieutenants half-pay, and to send them off with pensions at the expense of the country, which they have not justified by their length of service, into some other work, for instance, farming in Manitoba or Virginia, stock raising in Australia or the far West. Now that is not desirable, but it will continue so long as the chiefs in this subject are not fully impressed with the necessity of a change in the whole system. No mere change which will bring Officers later into the Navy will do anything for you, as long as you are bound to have so many subordinates in proportion to your chiefs, as long as you are bound to have trained men to command trained men. Midshipmen may be all that Mr. Laughton thinks, but he will find when he comes to look into the matter that even in commanding a boat there is a training which makes a man respected, and which makes the men aware that their young

Officer knows what he ought to do, and what they ought to do. This can only be gained by constant intercourse with the men, and not by pitchforking men on board a ship from the mercantile marine. The result of any such system must be to destroy a profession which has been reckoned amongst the most noble and best conducted in the world, by resorting to extraordinary remedial measures, of doubtful value, when we have the example before us of remedial measures which will do all we want without injustice to anybody, and without any strain upon the pecuniary resources of the country.

Commander W. DAWSON, R.N.: I am sure Admiral Selwyn and Captain Long will remember that this is a free country, in which we cannot get the House of Commons to take charge of the business of the mercantile marine, and tell them who they are to employ in command of their ships. I am afraid we have not arrived at that point yet, and I do not think we shall, unless the country gets into a state of such imminent danger as may render it necessary to alter the Constitution. The tendency of legislation has been to allow mercantile men to manage their own affairs, and to act in their own way, and I am afraid that tendency will rather increase than diminish. The position I understand Mr. Laughton to take up is this: that so long as we have a disproportionately large number of Lieutenants on the list, looking for promotion to the position of Captains and Commanders, there must be a great deal of disappointment and discontent, because there must be, in that case, a great number of Lieutenants who cannot possibly reach the rank of Captains and Commanders at a reasonable age. I do not think that the remedies that have been suggested in opposition to Mr. Laughton are such practical remedies as Parliament would adopt. I do not mean to say that these alternative suggestions would not work, but I do not think there is any chance of our getting them adopted. There is not the slightest chance of the House of Commons, with its shipowning Members watching their own interests, interfering in this way in the management of the mercantile marine. But it has struck me that there is a mode in which the quarter-deck duties might be done, which Mr. Laughton has left out of sight. I refer to a class of men who would not look forward to promotion beyond the Lieutenant's rank, such as we have in the *élite* of the warrant officers of the Navy. There we have an inexhaustible supply of capital material. They might be promoted to a rank corresponding to that of Lieutenant, to perform the quarter-deck duties with the understanding that they would never advance beyond that point. There are amongst the warranted gunners intelligent men, who would qualify themselves for any examination that might be required. As a class, they are increasing in education, intelligence, and trustworthiness, year by year. The Royal Navy is such a conservative force that there is no chance at present of a man before the mast, however able, however superior, however distinguished, whatever his birth, his talents, or his services, getting promotion to commissioned rank in the way that such men are advanced in the Army, and in other professions. Let the Lieutenants' duties be taken by able young warrant Officers, promoted to the quarter-deck and the ward-room rank, by whatever name you might choose to call them—Second Lieutenants, or anything else. There you would have a permanent staff of excellent seamen, who would not be looking forward to advancement to the higher ranks, and quite as intelligent and able as the style of Officer who is likely to volunteer for temporary service from the mercantile marine. I must say that I quite agree with Mr. Laughton as to the desirability of cadets entering at a later age. It was all very well to enter as children in our young days, when we used to go to sea at once in brigs, and had some chance of learning seamanship in boyhood, but now, when a boy enters at fourteen or fifteen, he goes on board a school-ship moored head and stern in Dartmouth, and from thence he goes on board an ironclad, to prepare for his college examination by another bout of schooling under impossible conditions, where he rarely sees seamanship of any kind, and is never placed in a responsible position. All this schooling under difficulties, up to the age of eighteen, would be done much better on shore. He would be much better exercising his intelligence in public schools on shore, and then he would be able to pass a much higher examination than at present. There is a great deal of Mr. Laughton's paper that I thoroughly agree with. But we are naturally a conservative service. We do

not like change; at any rate, such radical changes as Mr. Laughton proposes, but the whole condition of service at sea is changing; the nature of the weapons we have to fight with is changing; the ship herself is changed; and unless the Officers change with these, they will find themselves in the background. I once heard a great authority on matters of this kind, the late Commodore Goodenough, say that if naval Officers sink relatively in intelligence, position, and moral courage, as compared with other professions, "the time may come when it will be necessary to send Members of Parliament, Cavalry Generals, and Colonels of Militia to take charge of our ships in war." If we do not keep pace with the times, we shall lose the high position of naval Officers, capable of advising the Government in the management and control of naval affairs. We want men of smart intellects, of good education, and knowledge of affairs, which can only be got by opening up to naval men spheres of responsibility outside mere professional routine, so that the time necessarily spent on half-pay may be spent in the service of the country in responsible positions on shore. This is the real higher education.

Admiral SELWYN: I should like to say one word in explanation. With regard to the French system, Captain Dawson is entirely mistaken. The French system requires nothing from the House of Commons, and nothing from the Government, but it opens an inducement to the fathers of children to send their sons into the Royal Navy for four years, so that they may be more acceptable to shipowners as trained and intelligent men. There is no difficulty about the system; it wants no interference whatever, and it works admirably.

Admiral the Right Hon. Sir JOHN C. D. HAY, Bart., C.B.: While thanking Mr. Laughton for having introduced so interesting and important a subject of discussion, I should like to say that I do not quite come to the same conclusions as he has arrived at. His historical narrative is most interesting; but the particular question is, how promotion is to be expedited in the Navy? How young Officers are to get on in their profession with a view to success in life, and to serving their country faithfully and with distinction? So long as this terrible stagnation continues, you cannot expect the emulation and the ambition which are so valuable a stimulus to those engaged in the public service, to remain in the breasts of men who see no opportunity of getting on in their profession. Everything depends upon the Lieutenants' list. The number of men on that list must be subjected to strict scrutiny. I do not quite agree with what Mr. Laughton has suggested as being practicable in the present condition of the country. I doubt very much whether Lieutenants raised from before the mast, to go no further on in the profession, would be accepted as proper Lieutenants for the present Navy; but I do think that the number of Lieutenants having been accurately fixed, and the supply known with reference to wear and tear, death, leaving the Service, and so on, the number of persons entering the Navy below to rise to be Lieutenants ought not to be in excess of the necessary wear and tear. That the duties of midshipmen, of Sub-Lieutenants, and junior Officers, might be performed to a much greater extent by warrant officers, and persons of that class, is possible. I am in favour of a later entry, as Mr. Laughton has suggested. I have frequently had the opportunity of saying so, both here and elsewhere. But I quite recognize what has been said by my honourable friends who have preceded me, with reference to the advantage of the training and education of young Officers on board ship, and the readiness of resource which is thus given them. Although I have great admiration for Eton, Harrow, and other public schools, still, I think that the youngster who is sent to sea is probably a sharper fellow than other boys of the same standing at public schools. That is quite possible; but, nevertheless, I think that if it were found to be advantageous to make the date of entry a little later than it is now, I should concur in that suggestion. I certainly think that no person ought to be allowed to come into the Navy beyond the number that could rise to be Lieutenants, within seven, eight, or nine years of their entrance. There is one suggestion that Mr. Laughton has not made, but which appears to me to be necessary. If you wish to have a Lieutenants' list in such a way as to secure a certain amount of promotion, the way to do that is to increase the upper lists. We are not in China, and bound to adhere to rules which we found disadvantageous, and we have no immutable law preventing an increase in the Flag list, the Captains' list, or the Commanders' list; and I think

those lists ought to be accurately adjusted in such a way as to give a proper flow of promotion from the Lieutenants, through the various ranks, so that any man of fair ability and honourable service might have an opportunity of rising to the higher branches of the profession, even although he might not be employed there. I think that is the solution of the difficulty of obtaining rapid and necessary promotion, and I think that is what the country ought to be perfectly prepared to pay for. I desire to speak of the authorities with all respect, and without reference to party; and I will only say, if the authorities of the Admiralty would only see their way to recommend to Parliament a considerable increase in the upper lists, a great advantage would be gained. Until that takes place, I do not see how you can prevent the stagnation (though tempered no longer even by jobbery) which at present exists, and which is such a disadvantage to the profession. I think, also, as a matter of arrangement for the Admiralty, that the employment of Commanders ought to be larger than it is at present. If there were a greater number of Commanders employed by appointing them in all post-ships and in independent commands, instead of Lieutenants, the number of the latter would be diminished, and the number of chances of promotion would be increased. I believe that a proper adjustment of the Navy with reference to the number of Lieutenants, and the further adjustment that I have suggested with reference to the employment of Commanders in relief of Lieutenants, and in diminution of the numbers of that list, would go a long way to assist Mr. Laughton in the excellent proposal which he makes for a more rapid promotion in the Navy. With reference to what has been said of the employment of Officers of the Navy in the mercantile marine, I do not think it is absolutely impossible that that might be done. I was glad to hear Mr. Donald Currie give a lecture on that subject in this place not long ago, in which he spoke of that subject, and also of the employment of the ships of the mercantile marine, for services in the Navy. That would be a most valuable arrangement by which thirty or forty merchant ships may be known to be ready in the event of war; and others are encouraged by certain payments to fit themselves for similar purposes. Mr. Currie himself suggested that there would be no difficulty in his mind, and in the minds of other shipowners, in employing Lieutenants in the Navy, in order that, when war broke out, they might be put in command of the ships in which they had already served. How far that is possible was not discussed; still, it was encouraging to hear that that was the idea of an eminent shipowner. I throw it out for what it is worth, so that it may be considered by Mr. Laughton and others who have the interest of the Service at heart.

The CHAIRMAN: I am sure you will desire to express your thanks to Mr. Laughton for his most valuable paper. He has made many useful suggestions, which I trust will permeate through the Service, and give good results. In the introduction to his interesting historical *résumé* he called our attention to organization and discipline in connection with promotion. I understood him to mean that everybody should be promoted at such a time and such an age as shall enable him efficiently to do his duty in the higher ranks as he attains them. It is of no use to promote Lieutenants to be Commanders when, from their age, they can never be raised higher. That is the great problem of promotion in the Service. The observations of Sir John Hay, about taking off the restrictions upon numbers in the higher ranks in the Navy, are very valuable, and I should like to see them carried out. The most numerous rank of Officers required for the Service is that of Lieutenants. Having fixed the proper number of these, you ought not to hesitate to promote them to be Commanders, and thence to Captains, if properly qualified, when they are of an age to attain the still higher ranks, and efficiently perform the duties of them. The lecturer made some reference to an opinion I expressed some six years ago with regard to entering the Navy at a later age than at present. I hold the same opinion still. What has been said about the aptitude in seamanship acquired by very young lads, might have held good when most of us here went to sea, because we were practising seamanship all the day long. Now, some young gentlemen never see a ship tack, or any of the most ordinary evolutions of sailing ships; so that the circumstances have completely changed. The subject is one on which there are great differences of opinion, and it is no use taking up your time in discussing it further. I now ask you to give your cordial thanks to Mr. Laughton for his valuable paper.

MR. LAUGHTON: You, Sir, have anticipated what I was going to say in reply. To go further into the question of the age of entry would lead us beyond our present limits of time. But I would add, in respect to what Admiral Selwyn said about the French system, that it is, or certainly was a few years ago, the law of France, that an Officer of the mercantile marine was not qualified for a certificate as First Mate or Commander, to make long voyages to foreign ports, until he had served two or three years in a subordinate rank in the Navy.

NAMES OF MEMBERS who joined the Institution between the 1st April and 30th June, 1880.

LIFE MEMBERS.

Bartram, G. W., Lieut. R.E.	Graham, Chas. E. F. C., Lieut. R.N.
Rothwell, J. S., Captain R.A.	Walker, G. Lawrie, Lieut. 93rd Highlanders.
Herbert, E. W., Lieutenant 60th Rifles.	Monro, H. E., Lieut. 52nd Regiment.
Gaskell, Fredk., Commander R.N.	Doughty, F. Proby, Captain R.N.
Phillipotts, R. V., Lieut. R.E.	Nugent, John V., Captain 51st Light Infantry.
Moncrieff, C. C. Scott, C.S.I., Major R.E.	

ANNUAL SUBSCRIBERS.

Browne, G. F., Lieut. 48th Regiment.	Smith, W. A. Grey, Lieut. 70th Regt.
Dean-Pitt, D. C., Lieut. R.A.	Sharpe, J. B., Lieut. R.E.
Walford, W. S., Lieut. R.A.	Mansel, E. G., Lieut. 52nd Regiment.
Shewell, George M., Major R.M.L.I.	Duncan, Andrew H., Lieut. R.N.
Kent, E. W., Major late 24th Regiment.	Sargood, F. T., Major Victoria Field Artillery, Melbourne.
Peacocke, William, Lieut. R.E.	Trimnell, G. F., Dep. Surgeon-General late Indian Army.
Quinn, J. R. W., Lieut. R.N.	Wallace, R. H., Captain R.A.
Raikes, Charles, Esq., C.S.I., Ben. Civil Service.	Reid, John Watt, M.D., Director-General Medical Department of the Navy.
Brind, Sir James, K.C.B., General R.A.	Dunsterville, L. D'A., Colonel Bombay Staff Corps.
Carnwath, Earl of, Col. late Indian Army.	Lemmon, Edwd. B., Captain 28th Middlesex Rifle Volunteers.
Elkington, J. H. F., Maj.-General.	Macedougall, D. B., Lieut. Duke of Edinburgh's Own Art. Mil.
Bromfield, F. W., Lieut. 22nd Regiment.	
Beckett, Arthur W. A., Capt. K.O.	
Tower Hamlets Mil.	
Walford, Neville L., Captain R.A.	

OCCASIONAL PAPERS AND NOTICES OF BOOKS.

This portion of the Number is reserved for Articles, either Original or Compiled, on Professional Subjects connected with Foreign Naval and Military matters; also for Notices of Professional Books, either Foreign or English.

It is requested that communications or books for review may be addressed to Lieut.-Colonel Lonsdale Hale, at the Royal United Service Institution, Whitehall Yard, London, S.W.

A CAVALRY TOUR OF INSTRUCTION.¹

In recommending to the careful consideration of Cavalry Officers the following article, for which we are indebted to Captain Carmichael, 5th Lancers, D.A.Q.M.G., Intelligence Branch, Q.M.G.D., Horse Guards, we would call attention to the fact that it is the first attempt, so far as we are aware, to supply in an English dress detailed information of "*how to teach*" Cavalry the important duty of reconnoitring in front of an enemy.—L. A. H.

The first Cavalry Tour of Instruction (Uebungs-Reise) in Austria, of the kind described in the following pages, took place in 1877; its objects were as follows:—

A. To picture to those who took part in it the distribution, movements, and general management of a large body of cavalry employed in reconnoitring in front of an Army;

B. To exercise each part of the reconnoitring cavalry in their actual duties, so far as this was possible in peace time;

C. To enable those engaged in it to enter into the spirit, and to realize the value of the strategical service of cavalry, and to accustom cavalry Officers to lead independent bodies and to arrive at decisions quickly.

The tour of 1877 proved so great a success that it was followed, in 1878, by that described in Colonel v. Merta's work; but whilst the former was intended generally to test the capacity of the cavalry in reconnoitring duties, the object of the latter was, in addition, to ascertain what special tasks could with advantage be introduced into these expeditions.

The tour is an Exercise, made as practical as possible by working on the ground. It is planned and conducted by Officers of the General Staff. In it take part a number of selected regimental Officers, who represent the patrols, squadrons, main body, &c., of which the Division supposed to be employed on the work of reconnaissance is composed. The practical work is supplemented by lectures delivered by the Staff Officers.

In the tour of 1878 the Officers employed were:—

¹ "Die Kavallerie-Uebungs-Reise in Mähren," vom Jahre 1878. Ueber Auftrag des K. K. Generalstabes Bearbeitet von Emanuel Merta, Oberst des Generalstabes-Korps. Herausgegeben auf Befehl des K. K. Reichs-Kriegs-Ministeriums. Wien, 1880. Druck und Verlag, von L. W. Seidel and Sons. Size 9¼" × 6" × ½". Pp. 228. Price 6 francs. Weight under 12 ozs.

Instructors : Officers of the General Staff, 1 Lieutenant-Colonel, 2 Captains ; 1 Commissariat Officer.

Under Instruction : 3 Field Officers, 4 Captains, 7 Subalterns.

Each of the former was allowed 1 horse and 1 servant ; each of the latter 2 horses and 2 servants. A party consisting of 1 Officer, 85 men, and 75 horses, was also employed to assist in carrying out the exercise.

On the 7th of August, all the Officers met at the town of Gaya to hear a lecture on the manner of conducting the exercise, and on the following points :—Necessity of practising cavalry in reconnoitring duties on an extended scale ; historical examples of services performed by cavalry ; arrangement of large bodies of cavalry for reconnoitring duties ; strength of patrols necessary for procuring information ; necessity of reconnoitring on a broad front, and of dividing that front into sections ; cavalry whilst seeking information must prevent the enemy from obtaining it ; the necessary grouping of a Cavalry Division with reference to its depth ; the final means of obtaining information or preventing its being obtained, by the collision of cavalry in masses ; effects of the reports from the front on the movements of the main body.

The imaginary strength and disposition of the Cavalry Division, portions of which were to be represented by the Officers under instruction, was then explained.

The Division consisted of 2 brigades of 2 regiments of 6 squadrons, and 2 batteries of Horse Artillery, each with 6 guns ; 2 Rifle battalions were attached.

The 1st Brigade was supposed to be south of Gaya ; the 2nd Brigade about Bisenz and Gaya ; the Artillery at Gaya ; one Rifle battalion at Bisenz, the other at Borschau. The parks were at Göding and Holic.¹

The General and Special Idea, which were as follows, were now communicated to the Officers :—

General Idea.—"On the night of the 7th August, after the victory in the neighbourhood of Czeikowitz-Tscheitsch,² with the front looking north-west and north, the mass of our own Army is on the line Strazowitz-Pawlowitz,³ and with the 1st Cavalry Division on the right wing. For certain reasons, the enemy could not be pursued, and the touch has been lost ; the fortress of Olmutz⁴ is in possession of the enemy."

Special Idea.—"The Division, after a long march by Holic-Göding, at the close of the battle, at 8 P.M., reaches Gaya, and has to detach the 3rd Dragoon Regiment, under Major-General B. 2, to Bisenz, to watch the neighbourhood of Pissek-Zerawitz. (Then follow the orders as to forage, &c.)"

"2. The 11th Rifle Battalion of the 10th A. C. is in Bisenz ; its duty is similar to that to be performed by Major-General B. 2, and it is temporarily under his orders.

"3. The villages about Gaya have been deserted by the inhabitants, and are almost filled with wounded. This does not apply to Bisenz and Wrazow.

"4. The disposition of the Division for the night was given out verbally after 8 P.M., as follows :—The Division will bivouac ; 4th Dragoons between Gaya and Nietschitz. Under command of Major-General B., 1st Cavalry Brigade between Gaya and Swatoborschitz, the Divisional Artillery and Field Hospital at the Trawniker M.

"The Divisional Headquarters at Gaya.

"The 1st Cavalry Brigade will place a post in Gaya, whence also the orders will be issued.

¹ Both about 10 miles south of Gaya.

² Both south-west of Gaya.

³ Pawlowitz is about 12 miles south-west of Strazowitz.

⁴ Olmutz is about 24 miles north-east of Wischau.

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"Outposts on the line Kosteletz-Borschau-Wieterschau are furnished by the 10th A.C. (12th Rifles specially at Borschau). 3rd Dragoons remain at Bisenz.

"To maintain connection with the latter, from which a squadron is detached to Wrazow, the 4th Dragoons must push a squadron to Wilkosch; this "squadron must endeavour also to obtain news from Jeschow." (Then follow orders for baggage train, &c.)

The exercise began on the 7th by a visit of all the Officers to the supposed camp of the 1st Hussars, and Lieutenant-Colonel F., who was the commander of the main body, lectured on the choice of camp, protection necessary, &c. On returning from this visit the Chief Instructor gave out the Army Corps Order, supposed to be received at 10 P.M. on the night of the 7th of August, extracts from which are subjoined :—

No. 201.

Army Headquarters.

The Cavalry Divisions advance to-morrow to find and pursue the enemy, &c., &c. The 3rd C. D. on the left wing, &c., &c. The 2nd C. D., in two columns, by Klobauk-Monitz and Nascedlowitz-Austerlitz, in the direction of Brünn.¹ The 1st C. D. goes to the River Hanna; its duty is to reconnoitre the country in the space between the March River and the Gaya-Butschowitz-Wischau road inclusive. Later it has to look out towards Olmutz.

Till further orders the 11th Rifles, now in Bisenz, and the 12th Rifles, on outpost at Borschau, both of the 10th A. C., are attached to the Division.

The 2nd C. D. is to seek for and maintain connection with the 1st.

Railways and telegraph lines are to be reconnoitred and their condition reported on to-morrow.

To-morrow, 8th August, is a rest day for the Army.

The communication between the 1st C. D. and Army Headquarters will be maintained by the 10th Corps Headquarters through Gaya, as far as Butschowitz and Koritschan. From that point the Cavalry Division is responsible.

The main force of the enemy appears to be in retreat on the Schwarzawa,² but considerable bodies have gone to Butschowitz and Koritschan. The left bank of the March from Ungarisch-Hradisch down is free from the enemy. The railway bridge at Napagedl³ is broken.

I expect reports to-morrow from the line Butschowitz-Koritschan-Buchlowitz, and later from the points reached by the column.

Army Headquarters, Mutenitz,⁴ 7th August, 1879, 9 P.M.

The Chief Instructor then proceeded to communicate to *all* the Officers the following orders for the 1st C. D., consequent on the A. C. order, for the purpose of giving them some idea of the manner in which such orders were framed; but they were warned against occupying their minds with anything but the carrying out the orders of their own immediate commanders.

The Divisional Orders were as follows :—

No. 43.

1st Cavalry Division.

Orders for the 8th August, 1878.

Divisional Headquarters, Gaya, 7th August, 1878, 11 P.M.

The enemy appears to have withdrawn with his main force in the direction of the Schwarzawa, but portions of his force have probably retreated towards the north by Butschowitz and Koritschan. On the left bank of the March River as far as Ungarisch-Hradisch there is no trace of the enemy. To-morrow the pursuit will be taken up.

The Division has first to reach the Hanna, but at the same time it has to reconnoitre the country between the River March and the 2nd Cavalry Division, which is advancing by Nascedlowitz-Austerlitz towards Brünn. With this object the main

¹ Monitz is north-west of Klobauk; Brünn is 12 miles west of Austerlitz.

² Flows near Brünn from the north.

³ Napagedl is to the north-east, on the March, and out of the map.

⁴ A few miles south of Gaya.

body of the Division will advance from Gaya by Bohuslawitz, Jestrzaby, and then, according to circumstances, towards Wischau or Zdaunek.

Major-General B. 2 with the 3rd Dragoons and the 11th Rifles attached to the Division, will move by Zlechau-Wellehrad to Zdaunek.

Major-General B. 2 (Lieutenant-Colonel P.) will look for and drive back the enemy in the space between the River March and an imaginary line joining Zerawitz, Oswitman, Stupawa, Strzilek, Hoschitz, and Potschenitz. He will reconnoitre the roads from Strzilek, through Zdaunek to Kremsier, from Neudorf to Zdaunek, and from Pisek by Altstadt, Tlumatschau.¹ He will report on the foregoing points, and also on the condition of the Bisenz-Tlumatschau telegraph line, and the nature of the destruction at the railway bridge at Napagedl.

One squadron is to move through Zerawitz, Stupawa, Strzilek, and an Officer's party through Napagedl-Tlumatschau.

The Rifle Battalion is to be pushed forward in wagons.

2. The 4th Dragoons will reconnoitre in front of the main body of the division, &c.

The 1st Squadron will move through Steinitz, Butschowitz, to Wischau, the 2nd through Bohuslawitz, Koritschan, Strzilek, Littenschitz, to Patschlawitz.

All the advanced squadrons are to push forward patrols as feelers to the Hanna.

3. Order of march of the main body of the Division :—Advanced-guard, 4th Dragoons (Lieutenant-Colonel R.) ; main body, Major-General B. 1 (Lieutenant-Colonel F.) ; 1st Hussars ; divisional Artillery : 2nd Lancers ; ammunition train ; hospital, &c., &c. ; Rear-guard, half squadron.

4. Hours of march :—The advanced squadrons of the main body, 6 A.M. ; the advanced-guard from Borschau at 7 A.M. ; the main body of the column, Major-General B. 2, at 6 A.M.

5. The 12th Rifles, attached to the Division, will withdraw its outposts in such a manner as to be able by 5 A.M. to advance on the line of march of the main body, but in front of it.

6. The long halt, unless interrupted by the enemy, will take place :

Major-General B. 2's column at the discretion of the Brigadier ; the main body of the Division on the Littawa between Lettoschau and Strzilek ; the advanced squadrons of the main body at Kozlan and Littenschitz. The advance will be resumed at 11 A.M.

7. The advanced squadrons will keep up connection generally by the right ; on reaching the line Butschowitz-Lettoschau-Strzilek, then during the long halt ; and on reaching the end of the march, it must be maintained on both flanks.

The 1st Squadron of the 4th Dragoons will establish a post of orderlies in Kozlan, in connection with that of the 10th A. C. in Butschowitz. Major-General B. 2 will establish an orderly service for direct communication with Army Headquarters. At first, south of the Mars Hills ; after passing them, the line will be diverted to Koritschan, from whence the 10th Army Corps will carry it on.

8. The Divisional staff marches with the advanced-guard of the main column.

9. I expect without fail reports from the squadrons in advance of the main body, and from Major-General B. 2 during the halt, and also on the termination of the march.

Major-General B. 2 is also to report any important news direct to Army Headquarters at Mutenitz.

10. The Division will attack the enemy if met, and the advanced bodies will keep this intention in view. If Major-General B. 2 is obliged to fall back before crossing the Mars Hills, he will retreat on Bisenz ; but after crossing them, towards the main body, if possible.

11.

12. } Orders for train, requisitions, countersign, &c.

13. }

The distribution of the Officers and men based upon the order of battle was now made. We omit in our summary all servants, &c.

Gaya party :—Direction : Lieutenant-Colonel M., Captain P.H., General

¹ On the March south-east of Kremsier.

Staff; Commissariat Officer K.; 1 trumpeter, 1 non-commissioned officer, 3 orderlies; attached, Lieutenant-Colonel R., 2 Subalterns.

Information patrol of the 1st Squadron of the 4th Dragoons: Lieutenant H., 1 non-commissioned officer, 9 men; 1st Squadron, Rittmeister W.; 1 non-commissioned officer, 5 men.

Information patrol 2nd Squadron of the 4th Dragoons: Lieutenant Z., 1 non-commissioned officer, 9 men, 2nd Squadron 4th Dragoons, Rittmeister N.; 1 non-commissioned officer, 5 men.

Head-quarters of the main body, Lieutenant-Colonel F.; 1 non-commissioned officer, 4 men.

Bisenz party:—Direction: Captain B., General Staff; attached, 1 Subaltern Officer.

Information patrols, squadrons, and main body, represented exactly as in *Gaya party*—but taken from 3rd Dragoons.

The Officers then received the following instructions, in the form of a lecture.

A. All orders received are to be carried out in earnest. The commanders who have to give out dispositions or orders are to do so in the exact form and manner that they would adopt on actual service. All parties are to follow the exact routes ordered, and are not to depart from them except to avoid passing over cultivation or when "Notices" from the Direction render it necessary. Manner and rate of marching are to be as if in earnest. Patrols are to pass woods, &c., in a proper manner. If the "Notices" say that a bridge is broken, a road destroyed, a place burning, these suppositions are to be respected; but, when obstacles occur which would easily be overcome in time of war as by the destruction of light fences, making of small bridges, &c., a departure from strict rule is allowed; the Staff Officer if present will reconcile as regards time and manner the actual conditions with the imaginary war condition, where the "Notices" give no special directions.

B. The commanders will receive information concerning the enemy partly from the orders which will reach them from time to time, and partly from the "Notices" which are to be opened and read at the time, place, and under the circumstances endorsed on the envelope. These "Notices" are to be carried out as soon as they are read, and the execution of the orders contained therein is to be written on the back of the "Notices" or on a separate piece of paper. The time of opening is to be written on the back of the "Notice." Written orders and reports which are prepared in consequence of the information contained in the "Notices" are not to be copied on the back of the "Notice"; the report or order number is only to be referred to. All "Notices" are to be brought to the next discussion.

C. All reports, orders and "Notices," which are sent to commanders actually existing by means of connecting patrols, are to be properly prepared and actually sent. Communications to imaginary commanders are to be written in full and put away with the "Notices" to which they refer.

D. On account of the smallness of the groups representing the different bodies, connecting service cannot be thoroughly carried out. The "Notices" contain information which meets this difficulty to a great extent. Men may be sent singly as connecting patrols.

E. Parties are to halt for the night at the places ordered in the "Notices," even if these places differ from those mentioned in previous orders. All provisions for security at night are to be imagined; but the orders are to be written out. The same rule is to hold good as regards requisitions.

The Commissariat Officer gave a short lecture on the subject of requisitions,

¹ "Notices" are items of information or orders given by the instructors, either in writing or verbally.

&c. ; the scale of allowances for the troops as if in real existence is shown to the Officers ; and watches were regulated by that of the Chief Instructor.

The lecture here ended and the Officers were dismissed.

The Commanders of the two brigades and 4th Dragoon Regiment remained behind to prepare their orders. The Chief Instructor examined these orders and altered or completed his "Notices" accordingly. The Brigade Commanders received the "Notices" for their commands for distribution ; the "Notices" for detachments which happened to be accompanied by a Staff Officer were given not to the commander, but to the Staff Officer for delivery at the proper time.¹

To prevent errors the "Notices" for each line of march were in different coloured envelopes.

It is perhaps desirable to say here that there was no enemy of any kind, even skeleton, on the ground. The enemy existed only in the minds of the Chief Instructor and the General Staff.

In the book we are discussing a chapter is devoted to the imaginary movements of the enemy, but this only served as a guide to the instructors.

The Officers under instruction learnt from the "Notices" which were handed to them, or which, when in their own possession, they were allowed to open at certain places and times, such fragmentary knowledge as they could have obtained in real warfare.

These "Notices" are in fact the most characteristic feature of the tour we are describing from Colonel v. Merta's book. We shall extract so much of the account as our space and the limits of our map render possible, enough we hope to explain the system ; for the complete account of the whole manœuvre our readers must have recourse to the book itself.

The commander of the 4th Dragoons communicated at 11 P.M., verbally to the commanders of the 1st and 2nd Squadrons, the following order of which they took notes in their memorandum books ; these notes he countersigned :

1. The main body of the enemy appears to have retreated on Brünn, but weak detachments seem to have fallen back by Buehlowitz and Koritschan.

2. They will be followed up to-morrow.

3. With this object the Cavalry Division has to reach the Hanna ; the main body will move off at 7 A.M., advance through Bohuslawitz to Jestrzaby, and then, according to circumstances, to Zdaunek, or Wischau.

4. The 1st and 2nd Squadrons will reconnoitre in front of the left wing of the Division.

5. The 1st Squadron will move off at 6 A.M., in the direction of Steinitz, Butzchowitz, and Wischau ; its object is to reconnoitre the space between the lines Archlebau-Drazowitz-Lultsch, and Gross-Lowtschitz, Millonitz, Neu-Hwiezdltz, Herolitz on the Hanna.

6. The 2nd Cav. Div., which is marching by Nasedlowitz to Austerlitz, will establish and maintain the connection with the squadron.

7. The 2nd Squadron moves off at 6 A.M., from Nietschitz, in the direction of Bohuslawitz, Koritschan, Strzilek, Littenschitz to Patschlawitz, and will obtain information on both sides of its line of march, connecting with the 1st Squadron, and with a squadron of the 3rd Dragoons, which will advance by Zerawitz, Stupawa, Strzilek to Zborowitz.

8. During the march, the squadrons are to have an Officer's party from 4 to 5 miles in advance, with other patrols as required.

9. If the enemy is met with, it is to be remembered that the main body of the Division will be moving ready to attack them.

10. Unless prevented, the 1st Squadron will halt at Kozlan, the 2nd at Littenschitz ; the march to be resumed at 11 o'clock. From 10 to 11, the main body of

¹ The Instructors may at any time modify the "Notices" originally drawn up, or may issue fresh "Notices" if circumstances arise to necessitate this during the course of the day's proceedings.

the Division will probably be found on the Littawa, between Lettoschau and Strzilek.

11. Connection is in general to be felt for, and kept up to the right; the columns must be connected on the line Butschowitz-Lettoschau-Strzilek, and Kozlan-Littenschwitz-Zdaunek, and to both flanks on reaching the end of the march.

12. Reports must be made to the Division during the halt, and on the conclusion of the march.

13. Food and forage for the 8th to be carried; for the 9th, to be obtained by requisitions near the line of march.

14. In the neighbourhood of Wieterschau, there are outposts of our 10th Army Corps, and at Borschau of the 12th Rifles; these latter move off at 5 A.M., towards Bohuslawitz and Jestrzaby.

15. The 10th Army Corps will establish a line of orderlies by Steinitz to Butschowitz, and from Gaya to Koritschan.

16. The sealed cover contains the countersign.

17. Each of the two squadrons receives two copies of the special map, and one general map.

The commander of the 1st Squadron 4th Dragoons, Rittmeister W., summoned at 12, midnight, Lieutenant H., imagined a Sergeant-Major, W., and gave both verbally the following orders (notes taken in memorandum book):—

The enemy (as in No. 1, previous orders); the Cavalry Division advances to-day to the Hanna, to look for and pursue the enemy; the 1st Squadron as in paragraph 5; the 2nd Squadron moves off at 6 A.M., and marches by Bohuslawitz-Koritschan-Littenschwitz to Patschlawitz. Lieutenant H., with 1 non-commissioned officer and 9 dragoons, will form the information-patrol in front of the main body of the squadron. He will move off at 5 A.M., and follow generally the line Sobulek-Wieterschau-Steinitz-Butschowitz-Bochdalitz-Wischau; our outposts are at Wieterschau; messages are to be sent without fail from Steinitz, from Butschowitz, from Bochdalitz, and after reaching Wischau; the squadron will halt between Kozlan and Bochdalitz, and move off again at 11 to Wischau.

After passing Wischau, you must be guided by circumstances; try to keep touch of the enemy; food and forage, &c., to be obtained as follows . . .; here is the countersign.

Sergeant-Major W., with 6 dragoons, will act as an information-patrol, go by Ostrowanek, Great Lowtschitz, through the Steinitzer Wood, to the guard-house (Wacht-haus), then by Lettoschau, Millonitz, Neu-Hwiezditz, and on to Herotitz.

Remaining orders similar to Lieutenant H.; watches compared; Sergeant-Major W. has a special map, Lieutenant H., a sketch map.

After dismissal of the patrol commanders, the Rittmeister W. gave the corporal of the day orders for the march of the squadron in the presence of the acting Sergeant-Major.

4 A.M., feed; 5.15, saddle; 5.30, form up.

The 10 men of Lieutenant H's. party must feed at 3 A.M., and saddle at 4.15.

Food and forage for to-day, 8th August, the ment ration in the canteen will be carried on the horse; casualties, both men and horses, remain behind with the regiment.

A.—THE INFORMATION-PATROL OF LIEUTENANT H. AND THE MAIN BODY OF THE 1ST SQUADRON.

A Staff Officer accompanied the patrol; the Director accompanied the main body of the squadron, and the Officers not told off for the day joined him. Lieutenant H. visited his men at 4.30, gave them general instructions about the march, and made Corporal K., as second in command, acquainted with the objects in view.

Lieutenant H. moved off at 5 A.M. (Im Rudel¹) and at trot and walk reached Wieterschau at 5.30.

The Staff Officer accompanying him, halted him here, and handed him a "Notice;" from this, Lieutenant H. learnt that he was close to an infantry main post, and that on enquiry its commander tells him, that the Smerdiak Mill was during the night occupied by a party of the enemy's cavalry, from which early in the morning scouts had ventured as far as Hrahowetz Mill and Nechwalin. In consequence of this information, Lieutenant H. determined not to take the easiest road by the Hrahowetz Mill, but that directly over the hill to Steinitz.

At 6 A.M., the patrol reached the hill between the Smerdiak Mill and the Great Lowtschitz Brook, from whence the Smerdiak Mill, Steinitz, and Great Lowtschitz could be overlooked. Lieutenant H. here learnt, by "Notice,"² that an enemy's horseman followed by 6 lancers was visible westward riding rapidly along the road towards the wood, beyond Steinitz; he therefore concludes his patrol has been seen by the enemy.

The fact that smoke is rising from the chimneys in Steinitz and Great Lowtschitz, tells him that the inhabitants have not fled; nothing of the enemy was seen in Smerdiak Mill. Lieutenant H. determined to move along the ridges towards Steinitz and follow up the enemy, but at the same time to obtain news from Great Lowtschitz.

With this object he gave at 6.5 A.M. the order :—

Dragoon D. 1, as commandant, will ride with Dragoon D. 2 to Smerdiak Mill; this he will examine, and then move on as left flankers to the patrol (which I shall lead on by the road to the left on Steinitz), by the bye-road further on through the valley; if no enemy is observed at the edge of the wood, the dragoons return to me. Dragoon D. 3 will ride with Dragoon D. 4 to Lowtschitz, see whether the place is occupied, and if not, he will enquire whether the enemy passed through yesterday, and if so, in what force.

The two dragoons will then ride past Steinitz on the right to the edge of the wood, and if they do not find the enemy, return to me. I shall halt on the high road at the edge of the wood.

Lieutenant H. then trotted on by the farm road towards Steinitz. A countryman whom he met on the way, "Notice," informed him that there were none of the enemy in Steinitz, but that yesterday, at 8 in the evening, 100 men of the enemy's cavalry coming from Gaya, halted near the Sugar Mill, but after a short time retreated towards Butschowitz; in the night, some 10 of the enemy's lancers were believed to be in Smerdiak Mill, and repeatedly single horsemen were sent from there to Butschowitz.

As nothing was seen of the enemy in or about Steinitz, Lieutenant H. ventured straight down the hill to the Sugar Mill, meanwhile ordering Dragoon D. 5 :—

Dragoon D. 5 ride straight through the town, trot and gallop, and return to me to the left on the road.

He trotted forward himself in the valley to the church opposite the wood.

On reaching the vineyard at the north end of Steinitz, the patrol by "Notice" learnt that they were fired on from the edge of the wood. They halted, and concealed themselves. Lieutenant H. dismounted, and ordered :—

Corporal K., I shall advance to look out, you are meanwhile the commander of the patrol; stay here, and send at once a man dismounted through the vineyard as a vedette.

The expression "Im Rudel" means in loose order, as a Staff and Gallopers follow their General.

² This was a verbal "Notice" from the Instructor.

Lieutenant H. advanced cautiously through the vineyard. During this time imaginary shots are heard to the right and left, a proof that the scouts sent out to the right and left have fallen in with the enemy.

Lieutenant H. could not pass the edge of the vineyard, as by "Notice" he was discovered and fired on. But he had been able to gather that the enemy consisted of dismounted cavalry, and occupied about forty paces of the wood's edge.

In the meantime, Dragoon D. 6 (the vedette) came up on foot to him; he gave him the order :—

Remain here; as soon as the enemy advances, fire a signal shot, and then come in at once.

Lieutenant H. now came back to his patrol, where he found Dragoons D. 2 and D. 4, who "Notice"¹ reported :—

We were fired on from the edge of the wood; there seemed to be about 5 or 6 lancers, one of them mounted. We saw nothing of the enemy and heard no news of him in Lowtschitz.

Lieutenant H. now made up the following report :—

4th Dragoons, 1st Squadron. Lieutenant H.

No. 1.

Report.

To the Commander of the 1st Squadron 4th Dragoons, on the march to Steinitz.

On the road north of Steinitz, 8 | 8 | 78, 7 A.M.

The border of the wood north of Steinitz is occupied by some 50 or 60 dismounted lancers. I cannot proceed with my march. Smerdiak Mill was occupied during the night by a cavalry patrol; none of the enemy are in Steinitz or Lowtschitz; there appears to be a squadron in Butschowitz, which retired yesterday evening from Gaya.

H., Lieutenant.

When the envelope was ready, he ordered :—

D. 8, carry this order by the same road as we came. Trot and gallop to the Rittmeister W.

He then ordered :—

Dragoons D. 2 and D. 4 return to D. 1 and D. 3; remain where they are, and report to me anything new.

Considering the strong opposing force that he had in front of him, Lieutenant H. did not think it would be any use attempting to get past the enemy by avoiding it, as he had already been seen. He therefore confined himself to an examination of the ground, so as to be able to assist the squadron when it came up.

Ten minutes before Rittmeister W. had to move off from Gaya, he was desired to communicate to the Director his object, his views, and the orders he had issued.

In accordance with the principle not to interfere with the freedom of individual decisions, the Director refrained from all criticism either of the apprehension of the task given, or of the way in which it was to be carried out.

To encourage the Officers in forming independent decisions, it is enjoined that the Instructor should enter into their ideas, and leave them a certain latitude as regards the technicalities of orders and leading; events will, as they arise, speak for themselves, and afford a standard for determining whether the means hit upon were suited to their object.

These principles guided the conduct of the Director, when shortly after passing Gaya, Rittmeister W. left the road in the bed of the Sobulka Brook,

¹ This was a verbal "Notice" from the Instructor.

which he thought he was following; and led astray by tracks of wheels went off towards the north, in the hollow to the west of Gaya. The immediate notice of the error would have been of no advantage.

The Director, who followed Rittmeister W. at 100 to 200 yards distance, considered it better to let Rittmeister W. ride on in error, and so give him an opportunity of spelling out his route on the old sketch map, of learning the necessity of accurate reading of the map, and the bad results which an accident of this kind might have on the connection with his patrol. After some considerable loss of time, the squadron reached Wieterschau.

From the supposed main post the same message was received as had been given to Lieutenant H., and besides, it was reported that that Officer had passed through at 5.30 in the direction of Steinitz. The squadron followed steadily the country road leading direct on Steinitz; on passing the bridge over the Lowtschitz Brook, the report No. 1 from Lieutenant H. was received. Rittmeister W. noted on the cover the receipt of the report, and gave the trooper who carried it the order to return to the patrol, and tell the commander that the squadron was moving up quickly to Steinitz.

The Rittmeister then led the squadron, trot and walk, to the north end of Steinitz, where, at 8.15, Lieutenant H. received him with the following verbal report:—

The edge of the wood on both sides of the road is occupied by the enemy; there are about 50 men, it appears, on the main road; and on each of the next farm roads, entering the wood to the left and right, about 5 or 6; an advance of mounted men against the enemy's position does not appear to me advisable; if the enemy is to be opposed by a fire action, I think the best plan would be to advance west of the road where the vineyard affords cover.

Rittmeister W. then ordered:—

Lieutenant H., draw in your detached men as soon as they are relieved by my scouts. Follow the enemy if he gives way.

Lieutenant O. (imaginary), I advance to reconnoitre the ground, and shall return immediately. Remain in the meantime halted on the road with the squadron.

Rittmeister W. having examined the ground found the ideas of Lieutenant H. sound, and decided to attack the enemy dismounted, and ordered:—

Column 1, Zugs 1, 2, 3, fire-fight. Dismount. Lieutenant O. commands the fire line, deploy left west of the road, then advance and drive off the enemy; right wing rests on the road. Zug 4, as reserve, remains mounted, and covers the right flank. Led horses to the rear to the church. I remain here with the patrol of Lieutenant H. To be carried out at once.

The enemy "Notice" did not wait for the attack, but during the deployment of the squadron gave way. Lieutenant H. followed on his heels. Rittmeister W. now ordered:—

Led horses to the front. Mount. Zug 4 rejoin.

Before the retreat of the enemy, Rittmeister W. received from the Director the following written memorandum, delivered by a supposed connecting patrol from the imaginary 2nd Cavalry Division.

5th Lancers, 2nd Squadron. Lieutenant L. To the Officer commanding the party of the 1st Cavalry Division advancing along the Steinitz-Butschowitz road.

Nasedlowitz, 5.30 A.M.

I am advancing on Austerlitz; as yet no sign of the enemy in front of me.

N. N., Rittmeister.

Rittmeister W. retained this imaginary connecting patrol till the state of affairs was cleared up; then he sent them back with the following information:—

Steinitz, 8.30.

I am in contact with an enemy's squadron which, overtaken in its retreat from

Gaya, attempted to make a stand near Steinitz, but is now falling back towards Butschowitz : I pursue.

W., Rittmeister.

Rittmeister W. gave out besides the following orders :—

Cadet N. (imaginary), ride with 4 dragoons as a left flank patrol with the advanced-guard to the first clearing in the wood ; follow this road to the left, and as soon as it leaves the wood, take the first bye-road to the right along the edge of the wood to Butschowitz (the map was supposed to have been shown this Officer).

Lieutenant L. 2 (imaginary), call in the left flank patrol, and give verbally in person an order to the right flank patrol to move forward as flankers along the road through the wood they are now on. Tell the commanders of the flank patrols that some 800 yards on in the wood the road descends, and until leaving the forest follows the bed of the valley in a northerly direction.

The advanced-patrol as before, Lieutenant L. 1 (imaginary).

The information-patrol of Lieutenant H., which had immediately followed the enemy, trotted in loose order along the road through the wood, and without having to fight, reached the Rothen Kreuz.¹ From here there was a good view looking down upon Butschowitz, and it was learnt that the main body of the enemy, a squadron, was moving at a trot from Klobautschek to Butschowitz.

Lieutenant H. determined to ride round this place, to gain the heights of Tschertschein, to ride along the ridge, and watch the enemy's squadron. With this view he turned off before Klobautschek, took the direction of Witzomelitz, and mounted the hill ; but when halfway up the hill, attacked in front and on the left flank by two strong patrols of the enemy, Lieutenant H. had to retire ; he was followed as far as the Littawa.

At about 9.45, Lieutenant H., in his retreat, had got back close to Klobautschek ; here he met the squadron, which in the meanwhile had come up. Whereupon he reported verbally to the commander what had happened. At the same time as this report was received, Rittmeister W. learnt from his advanced-patrol that dismounted cavalry were on the bridge near Butschowitz, who appeared not likely to give way without fighting. Rittmeister W. asked Lieutenant H. whether the Littawa was fordable, and on Lieutenant H. saying it was, he ordered as follows :—

Lieutenant H., I advance to the heights of Tschertschein, and from thence move on to Bochdalitz. Try to advance by Marhöf and the Wetternich Berg, and continue your reconnaissance duties. Lieutenant L. 1 (imaginary), stand fast with the advanced-patrol until I have reached Witzomelitz with my squadron. Then follow, and, as soon as the enemy leaves Butschowitz, try to gain the Butschowitz and Bochdalitz road ; then act as a left flank patrol ; take the left flank patrol with you. Zug-leader Z. (imaginary), with the centre patrol of the 1st Zug, as an advanced-patrol ; to that village (Witzomelitz) then to that height (Tschertschein). Trot!—March!

During the march from Klobautschek to Witzomelitz, the scouts of the enemy were observed on the heights of Tschertschein. The squadron passed Witzomelitz and gained the height. From thence the enemy's squadron was seen moving out of the north end of Butschowitz and retreating at a trot to Deutsch-Malkowitz. At this time, 10.10, a connecting patrol (represented by one man) from the 2nd Squadron of the regiment arrived with the following message :—

4th Dragoon Regiment, 2nd Squadron. To 1st Squadron Commander in Butschowitz.

Koritschan, 8 | 8 | 78, 8.30 A.M.

Last night 400 lancers, 500 infantry, and 6 guns were in Koritschan. The

¹ From this part of the account the word "Notice" is generally omitted.

heights north of Koritschan are occupied by a weak cavalry party. I attack them. The bearer is to be sent on by Lettoschau, Brankowitz, to Littenschitz.

N., Rittmeister.

To the dragoon who brought this information, Rittmeister W. handed the following :—

4th Dragoons, 1st Squadron. To 2nd Squadron Commander.

Height east of Butschowitz, 8 | 8 | 78, 10.15 A.M.

I have been in contact with an enemy's squadron, which retreats from my attack, and is being followed up in its retreat on Deutsch-Malkowitz. We have established connection with the 2nd Cav. Div. After a short rest I shall continue my advance on Wischau.

W., Rittmeister.

At this moment the report of the (imaginary) Sergeant-Major W. came in from Lettoschau :—

I learn from the inhabitants in Lettoschau that a squadron of the enemy's lancers has retreated by Millonitz to Neu-Hwiezditz, and ought to have reached it about an hour ago. I follow them with my patrol on the same road.

Rittmeister W. prepared for the commander of the 1st Cavalry Division the following report :—

4th Dragoons, 1st Squadron.

Hill east of Butschowitz, 8 | 8 | 78, 10.15 A.M.

I have encountered a squadron of the enemy's lancers near Steinitz; have followed them as far as Butschowitz; they are falling back on Wischau; I follow. Connection established with 2nd Cavalry Division in Steinitz. The report relating to that forwarded.

W., Rittmeister.

Ride, trot, and walk by Newojitz, Lettoschau, if necessary to Strzilek; return by Bochdalitz to Wischau.

The orderly from Sergeant-Major W. received orders to rejoin by Neu-Hwiezditz. Rittmeister W. utilized the time required for the despatch of the connecting patrol and the preparation of the report, by giving his squadron a rest; he determined to pursue his march, not on the valley road but on the road by Kojatek to Bochdalitz.

Lieutenant H. had, in the meanwhile, led his patrol to Marhöf, and learnt that none of the enemy were there; he rode rapidly through Marhöf, crossed the Littawa, and moved on in the low ground to Lettonitz. The patrol, however, must have been observed by the enemy, for by "Notice" during the passage of the Littawa, two of the enemy's scouts were seen on the heights east of the Lisker Mill; they retreated slowly up the slope from Butschowitz to the Wetternich Berg.

What "Notice" Lieutenant H. learnt on the road from the miller of Lisker Mill is contained in the following report :—

4th Dragoons, 1st Squadron. Lieutenant H.

No. 2.

Report.

To the Commander of the 1st Squadron, 4th Dragoons.

Lisker Mill, 8 | 8 | 78, 10.10 A.M.

An inhabitant of Krzizanowitz says he saw early this morning several hundred horsemen and many wagons marching from Nischkowitz by Austerlitz towards the Posoritzer cross-roads.¹ I have a weak patrol before me.

H., Lieutenant.

Trot and walk by Butschowitz, Kojatek, Bochdalitz.

In front of Lettonitz Lieutenant H. struck off to the westward and reached, unopposed, the copses. He then followed the road from Niemtschau to the Wetternich Berg. On leaving the wood an enemy's horseman was seen on the

¹ Westward outside the map.

Wetternich Berg; clouds of dust in the neighbourhood of Deutsch-Malkowitz showed that something unusual was happening. No trace of the enemy was seen near Drazowitz and Lettonitz.

Lieutenant H. determined, as he could not advance further unobserved, to remain for the present in the wood and give his horses a rest.

Rittmeister W. moved on again with his squadron at 10.25 A.M. to Kojatek. Immediately after commencing the march, Sergeant-Major W. (imaginary) sent in the following report :—

4th Dragoon Regiment, 1st Squadron. Sergeant-Major W.

No. 2.

Report.

To the 1st Squadron of the 4th Regiment in Butschowitz.

Millonitz, 8 | 8 | 78, 9.50 A.M.

The inhabitants in Millonitz agree in asserting that at 8 o'clock in the morning 4 squadrons of lancers, 1 battalion of infantry, and 6 guns, commanded by a General, coming from Neuschoss, passed through Millonitz to Kozlan. An hour ago another squadron of lancers followed this column. I have an enemy's patrol in front of me, but I do not think they have observed me. I move on to Neu-Hwiezdilitz.

W., Sergeant-Major.

This report was acknowledged as follows :—

To Sergeant-Major W.

Tschertschein, 8 | 8 | 78, 10.25 A.M.

A squadron of enemy's lancers has retreated along the road Butschowitz-Bochdalitz.

W., Rittmeister.

Rittmeister W. passed Kojatek with his left patrol (imaginary), Lieutenant L. 1 working along the ridge west of that place, and took the direction of Kozlan. The enemy's squadron had in the meanwhile retreated behind the ridge which separates Deutsch-Malkowitz from Kozlan. Only a patrol was visible on the ridge as Rittmeister W. reached the cross-roads Kojatek-Kozlan, Deutsch-Malkowitz, Neu-Hwiezdilitz. He suddenly perceived a squadron moving against him from the north, and another from the north-west. He did not await the attack, but rode at a trot back to Kojatek. The enemy's detachments did not follow him up, but soon went about and disappeared behind the hills, whereupon Rittmeister W. fronted and resumed his march.

At this time, 11 A.M., the following report came in :—

5th Lancers, 2nd Squadron.

Austerlitz, 8 | 8 | 78, 8 A.M.

Have reached Austerlitz. The enemy, about 2 cavalry regiments and a battery strong, is in retreat on the Posoritzer cross-roads. I follow him.

N. N., Rittmeister.

The imaginary connecting patrol which brought this message received the following message in return :—

4th Dragoons, 1st Squadron.

To the 2nd Squadron of the 5th Lancers.

Height east of D. Malkowitz, 8 | 8 | 78, 11 A.M.

6 lancer squadrons, 1 battalion, and 1 battery of the enemy retreated early this morning from Koritschan to Wischau. I am in contact with the rear-guard of this column and advance on Wischau.

W., Rittmeister.

Trot and walk by Butschowitz and Austerlitz.

Rittmeister W. reached Kozlan unopposed and determined to halt here an hour. To secure the rest, he ordered :—

Corporal K. 1, ride to Lieutenant L. 1, to the left on the road; tell him that the squadron will rest here till 12.30. The lieutenant is to advance on the heights (between Boehdalitz and Kutscherau) and secure the left flank of the squadron.

Corporal K. 2, ride to the advanced patrol and tell the Zug-leader Z. that the

squadron will rest here till 12.30. The advanced-guard will push on to the wind-mill.

Corporal K. 2, ride to the right flank patrol, &c. The flank patrol will advance along the road to Neu-Hwiedzdlitz till a good view is obtained, and act as protection on the right flank.

Rittmeister W. learnt in Kozlan that about a battalion of infantry, four squadrons of cavalry, and six guns, coming from Millonitz had passed Kozlan in the direction of Bochdalitz, and that shortly after 11 another squadron had followed this column.

Lieutenant H. reported at 12 :—

4th Dragoons, 1st Squadron. Lieutenant H.
No. 3. *Report.*

Wetternich Berg, 8 | 8 | 78, 11 A.M.

2 squadrons of the enemy are in retreat from Kozlan to Maunersdorf ; from the clouds of dust there appear to be large bodies of troops near Wischau ; a column of the enemy, of about 1 squadron and 1 company, are marching from Rosternitz to Lultsch. Movement going on on the railway from Raunsitz to Wischau.

H., Lieutenant.

The commander of the 1st Squadron collected the messages received since 10.15 in the following report to the commander of the 1st Cavalry Division :—

4th Dragoons, 1st Squadron. Rittmeister W.
No. 2. *Report.*

To the Commander of the 1st Cavalry Division on the line Neuschloss-Brankowitz-Kozuschutz-Strzilek.

Kozlan, 8 | 8 | 78, 12 noon.

1 battalion, 4 squadrons of lancers, and 1 battery of the enemy are retreating from Millonitz by Neu-Hwiedzdlitz and Kozlan (report of inhabitants). They should by this time have reached Wischau. A detachment of the enemy, consisting of 1 squadron and 1 company, has retired from Bochdalitz by Rosternitz and Lultsch (authenticated by Lieutenant H.'s patrol). I have in front of me 2 squadrons of lancers of the enemy. I shall resume my march on Wischau at 12.30. We are in connection with the 2nd Cavalry Division. The message relating to that is enclosed.

W., Rittmeister.

During the halt Rittmeister W. gave orders :—

Corporal K. 2 (supposed), remain with 4 men as an orderly post till further orders, and carry on the letter service between Wischau and the orderly post established by the 10th Army Corps in Butschowitz. Obtain at once 3 stage carts, to save your horses. Feed at once and get food for your men from the authorities of the place.

In accordance with instructions, Rittmeister W. took steps to connect with the 2nd squadron of his regiment. To the orderly sent for this purpose he gave the following :—

4th Dragoons, 1st Squadron.

To the Commander of the 2nd Squadron, 4th Dragoons.

Kozlan, 8 | 8 | 78, 12.5 noon.

Reached Kozlan at 11.30. Rest here one hour. Am in contact with 1-2 squadrons of the enemy's lancers, which appear to be the rear-guard of a cavalry brigade. I have no news whatever of our own Cavalry Division. Send back the bearer by Kozlan to Wischau.

Ride, walk, and trot by Neu-Hwiedzdlitz-Littenschitz, then to Morkowitz.

Rittmeister W. thought also the following precautions necessary :—

One-year Volunteer F. (imaginary), ride, after the halt, with 4 dragoons of the 4th Zug, by Kutscherau to Rosternitz. About an hour ago a squadron of lancers and 1 company are believed to have retreated from Rosternitz to Lultsch. You will bring further news of this detachment, and remain cut during the night. Send reports through Hobitschau to Tlustomaczek-Wischau. In Rosternitz or Hobitschau requisition the necessary food and forage.

Lieutenant H. had, as we know, ordered a halt at the edge of the wood, between Lettonitz and Drazowitz. This halt lasted half an hour.

At 10.45 the last enemy's scout disappeared from the ridge of the Wetter-nich Berg. Lieutenant H. advanced to the hill, and reached the summit unopposed. What he here ascertained has been already shown in his report 3.

Soon after 11, Lieutenant H. led his patrol to Kutscherau, and as he could glean nothing there, he moved on to the Tlustomaczek Wood, which he gained at 12 noon. What he saw there, by "notice," he sent in the following report :—

4th Dragoons, 1st Squadron. Lieutenant H.
No. 4.

Report.

Tlustomaczek, 8 | 8 | 78, 12.30 noon.

The enemy's detachment reported on in No. 3, seen on the march from Rosternitz to Lultsch, came from Bochdalitz at about 10 o'clock. 4 squadrons of lancers, 1 battalion, and 6 guns of the enemy passed Tlustomaczek in the direction of Wischau. I can see this column marching between Wischau and Drnowitz ; I see their cavalry rear-guard at the south-east entrance of Wischau.

Since 10 o'clock 3 luggage trains have passed from Rausnitz to Wischau, and gone on towards Eywanowitz. I remain for the present in the Tlustomaczek wood.

H., Lieutenant.

Rittmeister W. led his squadron, at 12.30, through Bochdalitz and Mannersdorf, and received on the road No. 4 report from Lieutenant H. At 1 p.m. he got to Thereschau, halted his squadron, and himself rode on to Lieutenant H. From the hill of Tlustomaczek there is a good view as far as the Chaussée.

Rittmeister W. examined the country to his front with a telescope, and gathered—

a. Gleams of arms near Lultsch, near the church of St. Martin, and near Drnowitz ;

b. A small infantry detachment at the edge of the wood north of Drnowitz ;

c. Cavalry halted between Dieditz and Oppatowitz ;

d. A detachment probably in Brundlitz, because single horsemen were riding between that place and Wischau ;

e. Nothing remarkable on the Chaussées, Rausnitz-Wischau-Prossnitz, and Wischau-Eywanowitz ;

f. No movement on the railway.

The following report came in from (imaginary) Sergeant-Major W.

4th Dragoons, 1st Squadron. Sergeant-Major W.
No. 3.

Mahr-Preuss, 8 | 8 | 70, 11 A.M.

I have not come in contact with the enemy ; the inhabitants state that the column which passed Millonitz this morning took the direction of Kozlan. Small patrols visited Neu-Hwiezditz to-day, but none got as far as Mahr-Preuss. I am going on to Herotitz.

W., Sergeant-Major.

The decision come to by Rittmeister W., in consequence of the observations and reports, is contained in the following report :—

4th Dragoons, 1st Squadron. Rittmeister W.
No. 3.
To the Commander of the 1st Cavalry Division.

Tlustomaczek, 8 | 8 | 78, 2 P.M.

The situation in my front is as follows :—About 1 squadron of lancers and 1 company are at Lultsch-Nemojan ; weak detachments of infantry at Drnowitz and Dieditz, and a considerable body of cavalry (4 to 6 squadrons of lancers) between Dieditz and Oppatowitz. Wischau, Brundlitz, and Kreckowitz are occupied by the enemy. The neighbourhood of Toppolan-Herotitz appears free from the enemy. Any further advance would only lead to an unequal struggle with the superior force

of the enemy. I remain here, the more so that I have an excellent view of the country, as far as the edge of the forest west of the railway.

W., Rittmeister.

Sent by Kozlan-Lettoschau to Brankowitz.

In consequence of the decision come to, as expressed in the report, Lieutenant O. (imaginary), 2nd Zug, received verbal orders :—

The squadron halts west of Thereschau. Lieutenant O., with his zug, will undertake the outpost duty; establish a post at the south-west corner of the wood and another close to the ridge. With the rest of your men remain near Zouwalka, send out patrols as far as Hobitschau, and to the saddle south of Toppolan.

Rittmeister W. then gave orders :—

1st Zug and Lieutenant H.'s patrol can feed and cook; Zugs 3 and 4 inlying picket, in readiness.

The bearer of No. 3 report, sent to the Divisional Headquarters by Kozlan-Millonitz-Brankowitz, returned at 3 P.M. with the following order :—

1st Cavalry Division.

No. .

Kozlan, 8 | 8 | 78, 2.30 P.M.

Keep a look out and touch of the enemy. The main body will encamp between Kozlan and Bochdalitz; in the direction of Niemschitz-Kojetein, the line of the next column on the right, only small parties (apparently hussars), have fallen back. The countersign herewith, available from 9 P.M. till 9 P.M. to-morrow. Your orderly post in Kozlan has been ordered to rejoin you.

Rittmeister W. had now to think of his supplies, and as Thereschau and Zouwalka afforded none, he had to look to Marisch-Preuss, and Hobitschau; he therefore gave to an imaginary Pay-Sergeant-Major the following order :—

Feed your horse at 5 P.M.; ride to Mährisch-Preuss, and demand from the Burgomaster the articles in the requisition. Lieutenant L. 2 will give you 4 dragoons from his Zug No. 4 as escort. Let me know at once if the articles are not forthcoming. Try to return with the articles, which must be sent by the parish authorities, at 9 P.M.

In accordance with orders, Rittmeister W. had to establish connection with the 2nd squadron, he therefore ordered—

Lieutenant L. 2 (imaginary), send 2 well-mounted men to gain connection with the 2nd Squadron. Give them this report :—

4th Dragoons, 1st Squadron. To the 2nd Squadron, 4th Dragoons, in Patschlawitz. Enemy (1 cavalry regiment, 1 battalion, 1 battery) in and west of Wischau; the neighbourhood of Herotitz appears free from them. I am now and shall remain on the height of Tlustomaczek; the main body of the Division is about Bochdalitz.

W., Rittmeister.

Sent at 3 P.M., by Marisch-Preuss, Ribniczek Schwabenitz, to Patschlawitz. If this connecting patrol meets a corresponding one of the 2nd Squadron, it may return, after interchange of messages.

In the course of the afternoon the following reports came in :—

a. At 4 P.M. from the imaginary patrol of Sergeant-Major W. :—

4th Dragoons, 1st Squadron, Sergeant-Major W.

No. 4.

Report.

To the 1st Squadron, 4th Dragoons.

Hoschitz, 3 P.M., 8 | 8 | 78.

I have not during my march come in contact with the enemy. A patrol of the enemy of 4 lancers came here from Wischau at 11 A.M., and halted at the railway station till 12; at this time another patrol, same strength, came from Eywanowitz, the patrol leaders had a conversation, and on the spot the enclosed envelope was found.

Railway traffic suspended, the officials left and carried off telegraph instruments by 12 noon train; the line and wires are untouched. I remain here and shall pass the night in Ribniczek.

The envelope referred to had on it :—

Rittmeister R., 13th Landwehr Hussars.

To the nearest detachment under Major-General L., on the Wischau road. Route, Nezamislitz, Eywanowitz, Wischau; sent at 10 A.M.

b. At 4 P.M. from (imaginary) One-year Volunteer F.:—

4th Dragoons, 1st Squadron, One-year Volunteer F.

No. 1.

Report.

To the 1st Squadron, 4th Dragoons.

Rosternitz, 8 | 8 | 78, 3 P.M.

The inhabitants say that at about 10 A.M. about 150 infantry and 100 lancers passed through to Lultsch. I got as far as Lerchen Wood, and saw from there enemy's infantry by St. Martin's Church and at south-east entrance to Lultsch; orderlies are passing from Lultsch to Drnowitz; no railway traffic since 11; the enemy's infantry patrols are making for the Lerchen Wood, I stop therefore in Rosternitz; have made friends with a peasant, who remains in the Lerchen Wood.

c. At 5 P.M. from the 2nd Squadron of the 4th Dragoons :—

4th Dragoons, 2nd Squadron.

Patschlawitz, 8 | 8 | 78, 3.35 P.M.

Got here at 3 P.M.; have only weak detachments of hussars and lancers in front of me, which have retired over the Hanna. A large body has retreated on Bochdalitz. Please retain the bearer, and give him food and forage, and send him back at 4 A.M. to-morrow.

N., Rittmeister.

Rittmeister W. countersigned the reports of his patrols, and sent his papers on to Headquarters at Bochdalitz.

At 5 P.M., Rittmeister W. gave orders :—

Zug 1 takes the outposts over from Zug 2; Zug 4 feeds and cooks, relieves at 9 P.M. the 2nd Zug; 3rd Zug, inlying picket in readiness, cook and feed at 9.

Lieutenant H. will after 9 reconnoitre the Wischau-Pustomirz road; he should procure a guide.

It may be remembered that in the Gaya party attached to the General Staff, were a Lieutenant-Colonel R. and 2 Subalterns under instruction. This Lieutenant-Colonel R. is the commander of the 4th Dragoons mentioned in the account of the main body, and the Lieutenant P. is one of the Subalterns who becomes commander of the rifle battalion.

These, with Lieutenant-Colonel F., detailed at page 4, as commander of the main body, form the working party of the events about to be narrated.

B.—THE MAIN BODY OF THE CAVALRY DIVISION ON THE LINE OF MARCH, GAYA, KORITSCHAN, LETTOSCHAU, BOCHDALITZ.

Major-General B. 1 (Lieutenant-Colonel F.) gave orders to the Brigade-Major as follows for the march of the main body of the Cavalry Division :—

Reveille at the main guard at 4 A.M.; then feed. At 6.45, "Boot and Saddle" to be sounded; care of train, &c.

At 6 A.M., August 8th, Major-General B. 1 summoned the commanders of the 1st Hussars, the Divisional Artillery, and 2nd Lancers, and gave them the following verbal orders :—

The Division marches to look for and pursue the enemy to the Hanna; strong information parties are in our front; I command the main body; the 4th Dragoons form the advance guard; Lieutenant-Colonel R. moves off at 7 through Borschau, and marches first to Bohuslawitz and then to Jestrzaby; the main body passes Gaya at 7 A.M., &c.

The remaining usual orders for a march are written out. The commander

of the 4th Dragoons, Lieutenant-Colonel R., summoned his Staff and squadron leaders, and communicated as follows :—

The division, &c.; the regiment marches, &c.; patrols are in front of us; the 1st Squadron on the line Butschowitz-Wischau; the 2nd Squadron on the line Koritschan-Strzilek-Littenschitz-Patschlawitz.

The remaining orders for cavalry advanced-guard, infantry advance, side patrols, both left and right, a special squadron by a parallel road, the distance of the advanced-guard reserve 2 miles from the main body, and the train are written out in detail.

By means of the "Notices" the following events take place :—

The Lieutenant commanding the 12th Rifles learns from Lieutenant Z., commanding the information-patrol, that he has had to evade a dismounted party just beyond Bohuslawitz. Lieutenant P. resolves to attack them, and they give way; the head of advanced-guard reached Jestrzaby at 8 A.M.; the commander of the advanced-guard learnt from reports from the 2nd Squadron and from villagers "Notices" that the considerable forces of the enemy we have heard of at Wischau, &c., had moved across in that direction from Koritschan; Lieutenant-Colonel R. allowing the head of the advanced-guard to move on, returns himself to Lieutenant-Colonel F. to report; as he arrives, the report from the 2nd Squadron comes in to the main body to the same effect; hereupon the commander of the Division, represented by one of the Instructors, orders the column to take the Wischau road. Major-General B. 1 (Lieutenant-Colonel F.) orders the change of direction of main body; Lieutenant-Colonel R. is ordered to change his advanced-guard arrangements; the information squadron has notice of the change of route sent them; Lieutenant-Colonel R. gives his detailed orders for changes of side and advanced patrols; the march proceeds; the bridges across the Littawa "Notices" are found broken; the reports where materials for repair are to be found, and the calling up the imaginary pioneers, and the giving them their orders, are gone through.

The bank is scarped as a temporary measure, the cavalry patrols move on; ultimately the bridges are repaired, and the column halts to rest beyond the stream. The orders for the advanced cavalry during the halt are given. A portion of the rear of the column rests on the left bank during the halt.

Report No. 1 came in from Rittmeister W. viz., at 11 A.M.; this contained the report of connection with the Austerlitz column on the left.

Report No. 2 came in from Rittmeister N., viz., at 11.30; this contained a report of connection with the Bisenz column on the right.

Report No. 3 from Rittmeister W. came in at 12.30; this contained a second report of connection with the Austerlitz column, &c.

The Major-General of the main body and Lieutenant-Colonel F., the commander of the advance guard, receive from the Divisional Headquarters, at 11.30, orders for the resumption of march, and measures to be taken on its termination. The march proceeds to Kozlan; the advanced-guard reached Bochdalitz at 1.30, the main body at 2.

At 1.45, Lieutenant-Colonel R. summons his imaginary Staff and squadron leaders, and announces verbally :—

The Division encamps between Kozlan and Bochdalitz; we have to furnish the outposts.

The detailed orders are written out as supposed to be spoken.

Lieutenant-Colonel F. receives from the Divisional Headquarters the details for his encampment.

Lieutenant-Colonel F. gives orders on reaching camp :—

The Division will encamp here. Divisional Headquarters at the Parsonage. Brigade Staff at No. 45 House. Cook at once, &c., &c.

The main body having been brought into camp, we say a few more words concerning the outlying 1st Squadron and its patrols.

With outposts, it was not considered necessary to keep out the squadron. Therefore, at 4.30 P.M., orders went to the outpost commander and the 1st Squadron.

The 1st Squadron is to rejoin the regiment at Mannersdorf, only the outlying information-patrols will stand fast.

Rittmeister W. then gives orders to Lieutenant H. :—

1. The squadron marches in. You will report to the commander of the outposts direct, &c., &c. 2. The Paymaster to bring in the articles requisitioned on Wazan. 3. As we rejoin at once, the detachments who have not cooked and fed must do so in the new encampment. 4. Draw in the vedettes.

Lastly, Lieutenant-Colonel R., as commander of the outposts, gives orders for disposition of the rifle battalion.

We do not propose to give details of the 2nd Squadron nor of the information party of the right branch of the left column, nor of Major-General B. 2, the Bisenz column with its two information-patrols, its two information squadrons and main body, as limits of space prevent us from doing so. We pass on to the discussion following on the proceedings of the first day.

On the last "Notice" handed to each Officer on the 8th, the order was written for all Officers, each with a mounted orderly, to assemble on the 9th at Patschlawitz, for the discussion of the operations of the 8th.

When the Officers had all assembled on the 9th, they were questioned by the Chief Instructor on the events, orders, and decisions of the previous day.

We select our examples from those Officers whose proceedings we have described.

Questions Propounded.

"Lieutenant H. Did the view from the Wetternich Berg answer your expectations? Show the horizon of sight on your map. What points did you specially notice—road, railway, town of Wischau, &c.?"

The Instructor then made a few remarks on the value of a good telescope.

"Rittmeister W. Give your reasons for attacking the enemy at Steinitz. Where did you believe the neighbouring troops to be at the moment?"

Lieutenant-Colonel F., commanding the advanced-guard, was questioned. "What is your opinion on the subject of keeping up communications between the different parts of an advanced-guard and the main body? Should it be kept up from rear to front, or, as in our regulations, from front to rear?"

Lieutenant-Colonel F., commanding one of the main bodies, was questioned. "Is it sufficient to protect the flanks in the first line, or must the flanks also of the main body in rear be protected? How is this effected in a country where there are roads parallel with the line of march, and in a country where there are no parallel roads, but only cross roads?"

On the conclusion of this discussion the whole party rode to Zborowitz and then to Zdaunek, where similar discussions were held. Finally, all rode to Kremsier.

On the morning of the 10th, all Officers were assembled at Kremsier; and the Chief Instructor, after summing up the first day's operations, which took place on the 8th, gave out the dispositions for the second day's operations, to take place on the 11th.

As no order had arrived from the Army Headquarters, these orders were made on the information gathered by the 1st Cavalry Division, and contemplated a pursuit in the direction of Zwittawka, with the right flank covered towards Olmutz by the right column of Major-General B. 2. But after all details had been made out, the Army Order arrives, telling the 1st Cavalry Division not to go to Zwittawka, but to invest the fortress of Olmutz, and also to levy large requisitions for the army.

The Instructor issues fresh orders for the Cavalry Division, and points out the friction occasioned by such changes, and the time necessarily lost.

The Commissariat Officer lectured on the mode of carrying out the large requisition by means of the cavalry.

The Officers were then ordered to return to the stations which they occupied on the evening of the 8th.

The operations of the 11th were executed in the same manner as those of the 8th, and in the evening all Officers assembled near the Church of Dub.

On the 12th August, a discussion took place on the operations of the 11th, and afterwards an Officer of the General Staff lectured on a battle which had occurred in the neighbourhood on the 14th and 15th July, 1866, referring especially to the part played by the cavalry.

On the 13th of August, all Officers were made acquainted with the orders, &c., for the third day's operations, and on this day a new disposition of imaginary commands was made.

On the 14th of August, the third day's operations took place, and on the evening of that day, instead of the Officers being assembled, orders were sent to them as if in earnest to carry out certain orders on the following day.

On the 15th, these orders were carried out; final collisions took place with the imaginary enemy; railways, &c., were destroyed.

These operations only lasted during the morning, and in the afternoon all the Officers assembled to discuss the operations of the 14th and 15th.

After the discussion, the Officers of the General Staff and Commissariat gave a number of short lectures on military subjects.

The following hints are given for the carrying out of similar tours of instruction :—

1. The movements of a complete Cavalry Division form the best subject of instruction.

2. These cavalry expeditions cannot take place with an enemy. With skeleton troops, it would be almost impossible to work an enemy. If it were attempted, the instruction would become very complicated, and several instructors would be required to work it.

3. The notices should be spirited, but probable, and not too fanciful. The complicated nature of the exercise requires them to be thought out beforehand with great care.

4. Almost any ground may be chosen for the exercise, but it should, if possible, have marked features, and not be too intricate.

5. The general idea should give a clearly defined military situation.

6. The object which is closely connected with the general idea should be expressed in a military form, and have a military reality. Such objects might be the breaking of an enemy's communication, collection of news from a given area, covering the frontier, seizing and holding territory to give time to concentrate enterprises against the enemy's flank, capture of magazines, &c., and so forth.

7. The supposed cavalry bodies may be distributed precisely as we please at the commencement of the exercise, but they should be divided into a few portions, so that the tactical handling may commence at once without preparatory marches.

8. The Chief Instructor commands the Division, and the remaining Officers act as Brigadiers, regimental and squadron commanders, &c., giving their orders accordingly.

9. The exercise can be carried out in two ways :—1st. A particular portion of the Division can be represented by the Officers under instruction, and the cavalry detachments, and the remainder of the Division can be imagined. 2nd. Skeletons of the principal bodies concerned can be made up, and the whole Division worked. The first method is the easiest for the Chief

Instructor, for mistakes can be corrected on the spot. It is, moreover, simple and cheap. The second method, however, enables those taking part to realize the great distances which must be allowed for the friction caused on receipt of messages, orders, &c.; on the other hand, the second method is far more difficult to direct, and more expensive.

10. The "Tour of Instruction" under discussion was conducted on the second method.

11. It is exceedingly difficult to make the notices natural, and to make them come in at natural times to guide the course of events generally, and at the same time to allow the individual commanders complete freedom in their own decisions and choice of line of action.

12. The Chief Instructor has the difficult task of imagining the action of the enemy, not merely his general line of action, but at every given moment in detail. He represents the movements of the enemy in his "Notices" in accordance with information received from foot passengers met on the road—letters intercepted—imaginary views from hills, &c.

13. The representing of imaginary bodies by skeleton groups is referred to. 4 patrols, 4 squadrons, and 2 main bodies may be well represented by 21 Officers and 115 men. The other principal bodies marching in rear, such as infantry, attached artillery, train, &c., may be represented by 1 Officer and 1 orderly.

14. The "Notices" and the difficulties attending them have been referred to. They are given when possible to the Staff Officers, who are forbidden to interfere with the decision of the individual commanders as a rule, but they are permitted to modify or to add to the "Notices," if they see the general course of movement going wrong.

15. The value of the discussions.

16. The actual exercises took place on the 8th, 11th, 14th, and 15th. The Chief Instructor with the unemployed Officers attached himself to one party. He does not interfere with the commander, but carries on a conversation with the other Officers at the various stages. The leading patrols can carry out everything as if in reality, the skeleton squadrons must have imaginary flanking parties—advanced parties—vettes in camp, &c., but all the orders must be written out as if prepared by the Officer.

17. The days from 7th to 15th were divided as follows: 7th, 10th, 13th, and evening of 14th, to the issue of orders for next day. 8th, 11th, 14th, and 15th, for operations; 9th, 12th, and afternoon of 15th for discussion.

18. Officers are not to know where they will spend the night for fear of it influencing their movements, but each commander should direct the casualties of his party to collect at a spot rendered probable by the general disposition.

Fights of single squadrons are only to take place when their advance is checked by dismounted men.

One Officer is charged with all the administrative work, so as to relieve the Chief Instructor.

Final remarks:—There is great difficulty in practising Officers in cavalry reconnoitring duties on an extended scale in times of peace, on account of the vast extent of ground that has to be covered, the time necessary to perform the duties and the consequent expense. These "Cavalry Tours of Instruction," therefore with skeleton bodies are of great value.

The present tour covered in the four supposed days (not including the preliminary and discussion days), a length of about 60 miles and a front of some 15 to 20 miles.

The foregoing précis of the book describing the Austrian cavalry "Tour of Instruction" will, it is to be hoped, bring this subject to the notice of all cavalry Officers, who, on a perusal of the book in question, cannot fail to be struck with the value of the instruction. For some years past these "Cavalry Tours

"of Instruction" have been practised in Germany, Russia, and other countries. Verdy du Vernois calls attention to the subject in a supplement to his "*Beitrag zu den Kavallerie-Uebungs-reisen*," and it will be of interest to give a brief précis of his instructions on the subject. Referring to the "Cavalry Tour of Instruction" in Germany, 1875, Verdy du Vernois writes as follows :—"As a rule, only Officers of the rank of Captain and Subaltern should take part in these exercises. The number of Officers, the time taken, and the extent of ground worked over, must be regulated by the amount of money allowed to commanders. All expenses should be paid, but the allowance on no account exceeded. The Chief Instructor should be an Officer senior in rank to those under instruction. The exercise is, above all, intended to direct the attention of those engaged to the duties that they, or an Officer one rank senior to them, would have to perform in time of war. Discussions should as far as possible take place on the ground."

The interest of Officers in the exercises should not be diminished by calling upon them to furnish elaborate written schemes, &c., but, at the same time, great importance must be attached to their written reports, which should be rendered to the Instructor after the operations, accompanied if necessary by a map.

The importance of the services required of cavalry in modern warfare is acknowledged; every means therefore should be employed to practise that arm theoretically and practically in its different duties. In regimental exercises, on brigade and divisional field days and manœuvres, the Rittmeister's duties may be practised with advantage, but they can only be undertaken on a very limited scale. The exercise of bodies of cavalry far in front of the main army is what is required in order to enable cavalry to fulfil its mission in time of war. These "Cavalry Tours of Instruction" have been introduced in order to instruct Captains and Subalterns in the duties that would be required of them when employed on that duty.

Similar "Tours of Instruction" have been introduced for Officers of the Staff, but no attempt should be made to assimilate the instruction of the "Cavalry Tours of Instruction" to those of the "Staff Tours of Instruction."

It should be borne in mind that the object of the "Cavalry Tour of Instruction" is to instruct cavalry Officers "in the actual duties that would be required of them in time of war when working with large bodies of cavalry far in front of the main army."

The above is a short précis of some of the instructions, which are followed by a description of the operations that took place each day. The exercise referred to lasted for a period of nine days: six days were employed in actual operations and three days in discussions. A Captain and Subaltern from five cavalry regiments, and one or two Staff Officers and cavalry Officers, &c., volunteers, took part in the exercise, making a total of 17 Officers. The method of conducting these "Cavalry Tour of Instruction" varies in different armies, but their value is universally acknowledged. It is a subject which requires to be carefully handled and thoroughly thought out, and a study of the books referred to in the notice will prove of much assistance.

LISTS OF ARMoured SHIPS AND OF UNARMoured SHIPS OF THE NEWER TYPE BELONGING TO DIFFERENT FOREIGN NAVIES.

BROUGHT DOWN TO THE BEGINNING OF THE YEAR 1880.

THE following lists have been compiled from the Austrian *Marine Almanach*, the French *Carnet de l'Officier de Marine*, *Revue Maritime*, *Revista Marittima*, *Mithelungen aus dem Gebiete des See-wesens*, M. Dislere's *Marine Cuirassée*, Mr. King's "War-ships " of Europe," "Annual of the School of Naval Architecture," and other works. Figures from tables on the metric system have been reduced to the nearest English equivalent, avoiding minute fractions. In the armament of armour-clads, except gunboats, heavy guns only are given. The date is that of the launch of the ship.

This is believed to be the first attempt ever made to publish in England a comprehensive statement of the armoured and unarmoured vessels on the effective lists of the navies of all naval Powers.

ARGENTINE REPUBLIC.

Armoured Ships.

Class.	Name.	Mate- rial of hull.	Date.	Dis- place- ment.	Armour.		Horse- power.	Speed.	Armament.	Remarks.
					Thickest	Thinnest				
Turret ship	.. ..	Iron	..	tons. 4,000	in. 10	in. ..	..	knots. 14	.. ..	Building : armour to be of steel on iron.
Monitor	"El Plata"	"	1875	1,588	9	6	750 indic.	9½	2 9-in. Armstrongs	1 turret, 2 screws.
"	"Andes"	"	"	"	"	"	"	"	" ..	" ..

Unarmoured Ships.

2 iron-hulled corvettes, "Parana" and "Uruguay," 550 tons.
4 gunboats of the "Comet" class.
Several steam-vessels of older type.

AUSTRIA.

Armoured Ships.

Class.	Name.	Material of hull.	Date.	Displacement.	Armour.		Horse-power.	Speed.	Armament.	Remarks.
					Thick.	Thin.				
Battery ship ..	"Tegetthoff" ..	Iron	1878	tons. 7,390	in. 14½	in. ..	indicated.	knots. 14	6 11-in. Krupps	1 screw.
" "	"Custoza" ..	" "	1872	7,060	9½	6	7,200	14	8 10-in. "	"
" "	"Arch. Albert" ..	" "	"	5,940	8	6	4,821	13½	8 9½-in. "	"
" "	"Lissa" ..	Wood	1869	6,080	6½	..	4,057	13½	12 9½-in. "	"
" "	"Kaiser" ..	" "	1871	5,810	"	..	3,691	12½	10 9-in. Armstrongs	"
" "	"Don Juan" ..	Iron	1875	3,550	8	..	3,130	13	8 8-in. Krupps	"
" "	"Kaiser Max" ..	" "	"	"	"	..	2,900	13½	"	"
" "	"Prince Eugene" ..	" "	1876	"	"	..	2,866	13	"	"
Broadside ship	"Arch. F. Max" ..	Wood	1865	5,140	5	..	2,912	12½	14 7-in. Armstrongs	"
" "	"Hapsburg" ..	" "	1861	3,110	4½	..	3,090	12½	10 "	"
" "	"Salamander" ..	Iron	1871	310	2	1½	2,060	11½	2 6-in. Warendorfs	2 screws.
River monitors	{ "Mares"	" "	"	"	"	"	320	8½	"	"
	{ "Leitha"	" "	"	"	"	"	"	"	"	"

Unarmoured Ships.

Class.	Name.	Date.	Displacement.	Horse-power.	Speed.	Guns.	Class.	Name.	Date.	Displacement.	Horse-power.	Speed.	Guns.
Frigate ..	"Radetsky" ..	1872	tons. 3,430	2,500 ind.	knots. 14	15	Corvette .	"Zrinyi"	1871	tons. 1,340	230 nom.	knots. 11	4
" "	"Laudon" ..	1873	"	"	"	"	"	"Frundsberg" ..	1872	"	"	"	"
Dck. corv.	"Donau" ..	1874	244	400 nom.	12	13	Gun vessel	"Zara" ..	1879	830	320 nom.	"	4
" "	"Saida" ..	1878	"	"	"	11	"	"Spalato" ..	"	"	"	"	"
Corvette .	"Fasana" ..	1870	1,970	"	"	4	"	"Nautilus" ..	1873	570	90 nom.	"	2
" "	"Helgoland" ..	1867	1,820	"	"	5	"	"Albatross" ..	"	"	"	"	"

There are 2 frigates and 6 gun-vessels of the older type, besides yachts and small steamers.

BRAZIL.

Armoured Ships.

Class.	Name.	Material of hull.	Date.	Displacement.	Armour.		Horse-power.	Speed.	Armament.	Remarks.
					Thick.	Thin.				
				tons.	in.	in.		knots.		
Turret ship...	"7th September"	Iron	1876	"	"	"	300 nom.	"	4 9-in. Whitworths.....	2 screws.
"	"Solimões"	"	1875	3,700	12	6	2,200 ind.	11	4 10-in. ".....	2 turrets, 2 screws.
"	"Javary"	"	"	"	"	"	1,685	"	"	"
"	"Lima Barros"	"	1866	1,350	4½	3	300 nom.	12	4 7-in. ".....	"
"	"Silvado"	"	"	1,150	"	"	200	"	4 6-in. ".....	"
"	"Bahia"	"	1865	1,000	"	2¾	140	10½	2 7-in. ".....	"
"	"Tamandare"	Wood	"	980	4	2¾	80	8½	1 6-in. Whit., 3 S.B.'s...	1 screw.
Battery ship..	"Barrozo"	Iron	1864	"	4	3	412 ind.	9	5 rifled guns, 2 68-prs....	"
"	"Cabral"	"	"	1,033	4½	3	750	10½	2 6-in. Whit. 4 68-prs....	2 screws.
"	"Colombo"	"	"	"	"	"	200 nom.	10	8 68-prs., S.B.	"
"	"Herval"	"	"	800	"	"	"	"	4 7-in. Whitworths.....	"
"	"Mariz e Barros"	"	"	"	"	"	"	"	2 7-in. Whit., 2 68-prs....	"
"	"Brazil"	"	"	1,518	"	"	250 nom.	11½	4 7-in. " 4 " ..	1 screw.

There are 6 river monitors built of wood at Rio Janeiro in 1864, carrying one 6-in. or 7-in. gun in the turret. Their efficiency at the present date is doubtful. Their displacement is 340 tons.

Unarmoured Ships.

1 screw corvette and 2 gun-vessels are building; there are 5 older corvettes and several steamers and gunboats.

CHILL.
Armoured Ships.

Class.	Name.	Material of hull.	Date.	Armour.		Displacement.	Horse-power.	Speed.	Armament.	Remarks.
				Thick.	Thin.					
Battery ship ..	"Bl. Encalada"	Iron	1874	in. 9½	in. 4½	tons. 3,500	3,000 ind.	knots. 13	6 9-in. Armstrongs	2 screws.
" "	"Al. Ocelrine"	"	1875	" 5	" 3½	" 1,500	"	" 12	2 10-in. (12-ton) Arm.	"
Turret ship ..	"Huascar"	"	1866			1,101				1 screw.

Unarmoured Ships.

3 wooden corvettes, 2 gun-vessels, and a few other steamers.

CHINA.

The Chinese Fleet is of sufficient importance to merit being included in a list of the ships of foreign Powers, though its only armoured vessel is a small river gunboat. The provincial system is still to some extent adhered to, and there are squadrons with their head-quarters at Tien-tsin, Shang-hai, Foo-chow, and Canton. Nearly all the vessels are of small size, however heavy their armament.

Unarmoured Ships.

Class.	Name.	Date.	Displacement.	Horse-power.	Speed.	Guns.	Class.	Name.	Date.	Displacement.	Horse-power.	Speed.	Guns.
Frigate ..	"Hai-an"	? 1874	tons. ..	" ..	knots. ..	26	Gun vessel	"Teng-Ing-Chen"	..	tons. ..	..	knots. ..	6
" "	"Yu-Yuen"	" ?	" ..	" ..	" ..	"	"	"Wei-Yuen"	..	" ..	..	" ..	"
Gun vessel	"Mei-Yue"	1869	515	130 ind.	" ..	3	"	"Tai-au" .....	..	" ..	..	" ..	"
" "	"Foo-Sing"	1870	572	" 140 ind.	" ..	6	"	"Chun-wo" .....	..	" ..	..	" ..	"
" "	"Tcheun-hai"	1871	"	"	" ..	"	"	"Hok-Seng" .....	..	" ..	..	" ..	"
" "	"Tsing-Yuen"	1872	"	"	" ..	"	"	"Ching-woi" .....	..	" ..	..	" ..	"
" "	"Tcheuen-wei"	"	"	"	" ..	"	"	"Nie-sing" .....	..	" ..	..	" ..	"
" "	"Che-an"	"	"	"	" ..	"	Corvette..	"Yang-on"	1872	1,393	450	" 13	"
" "	"Wo-kai"	"	"	"	" ..	"	"	"Yung-woo" .....	..	" ..	..	" 8	"

There are also 8 gunboats on Mr. Rendel's plan, 4 of which each carry one 35-ton gun, 11 gunboats of a smaller class, and 8 steam-transports, besides a few small steamers, Customs' cruisers, and 1 torpedo-boat, having a speed of 16 knots.

DENMARK.

Armoured Ships.

Class.	Name.	Material of hull.	Date.	Displacement.	Armour.		Horse-power.	Speed.	Armament.	Remarks.
					Thick.	Thin.				
Battery ship...	" Helgoland "	Iron	1879	5,347	12	8	indicated.	knots.	1 12-in., 4 10-in. Krupps	Not complete.
"	" Odin "	"	1872	3,083	8	4½	3,700	12½	4 10-in. Armstrongs.	
Broadside ship	" Denmark "	"	1861	4,747	5	3½	2,260	11½	12 8-in. Arm., 12 6-in.	
"	" Peter Skram "	Wood	"	3,379	"	"	1,280	8	8 8-in. " 8 "	2 turrets.
Turret ship...	" Rolf Krake "	Iron	1863	1,361	4½	2	700	7½	2 " " " " " " " "	
"	" Gorm "	"	1870	2,344	7½	4½	1,670	11½	2 10-in. " " " " " "	
"	" Lindormen "	"	1868	2,087	5½	3½	1,560	"	2 9-in. " " " " " "	1 turret.
"	" Esbern Snare "	"	"	483	2¼	"	500	11	Whitehead torpedoes	
12 Torpedo ship										" 2 screws.

Unarmoured Ships.

Class.	Name.	Date.	Displacement.	Horse-power.	Speed.	Guns.	Class.	Name.	Date.	Displacement.	Horse-power.	Speed.	Guns.
Gun vessel	" St. Thomas "	1871	1,572	indicated.	knots.	5	Gunboat.	" Oresund "	1874	238	indicated.	knots.	1
"	" Ingolf "	1876	854	1,870	"	3		" Storebelt "	1875	"	183	"	1
Gunboat.	" Falster "	1873	356	510	"	1		" Lillebelt "	"	"	196	"	1
"	" Møen "	1875	"	523	"	1					187	"	

There are also 3 old-fashioned frigates, 2 corvettes, 4 gun-vessels, and 7 gunboats, besides small steamers.

FRANCE.

Armoured Ships.

I. Those with Hulls of Iron or Steel.

Class.	Name.	Material of hull.	Date.	Displacement.	Armour.		Horse-power.	Speed.	Armament.	Remarks.
					Thick.	Thin.				
Barbette ship	"Amiral Du- "peré"	Iron & steel	1879	10,487 tons.	in. 21½	in. 29½	indicated. 8,000	knots. 14	4 13¼-in. guns, 14 5½-in.	
" "	"Amiral Baudin"	Steel	..	11,441 "	"	12	..	..	? 3 100-ton guns, 12 5½-in.	Building.
Battery ship	"Formidable"	Iron & steel	..	"	"	"	..	..	"	"
" "	"Foudroyant"	..	..	9,639 "	15	8	6,000	14½	4 13¼-in., 2 11-in. guns ..	"
" "	"Dévastation"	..	1879	"	"	"	"	"	"	2 screws.
" "	"Redoubtable"	..	1876	8,796 "	14	"	"	14½	6 11-in., 6 lighter guns.	"
" "	"Friedland"	Iron	1873	8,916 "	8	6	4,428	13½	8 11-in., 8 5½-in. guns.	Building.
Smaller barbette ship	"Duguesclin"	Steel cased with wood	..	5,882 "	10	7	4,100	14	4 9½-in., 1 8-in. guns . . .	"
" "	"Bayard"	..	..	5,881 "	"	"	3,200	..	?	"
" "	"Turenne"	..	..	"	"	"	"	..	"	"
" "	"Vauban"	..	..	5,869 "	"	"	"	..	"	"
Turret ship	"Tonnerre"	Iron & steel	1875	5,580 "	13	10	4,166	14	2 11-in. guns	1 turret above an armoured breastwork.
" "	"Edmirant"	..	1877	5,584 "	"	"	..	..	"	"
" "	"Furieux"	..	..	5,695 "	19½	12½	..	..	"	Building, do.
" "	"Caïman"	..	..	7,239 "	13½	13½	..	..	? 2 16-in. guns	"
" "	"Terrible"	..	..	7,184 "	"	13	..	..	"	"
" "	"Indomptable"	..	..	"	"	14½	..	..	"	"
" "	"Requin"	..	..	"	"	11½	..	..	"	"

Class.	Name.	Material of hull.	Date.	Displacement.	Armour.		Horse-power.	Speed.	Armament.	Remarks.
					Thick.	Thin.				
Smaller turret ship	"Tempête"	Iron and steel	1876	4,524	13	10	indicated. 1,500	10	2 11-in. guns	1 turret above an armoured breastwork. Building. 1 turret, &c.
"	"Tonant"	"	"	4,523	17½	14	"	"	2 13½-in. guns	"
"	"Vengeur"	"	1878	"	13	10	"	"	"	"
Broadside ship.	"Couronne" . . .	Iron	1861	6,428	5½	3½	2,912	12½	8 9½-in., 4 7½-in. guns.	"
Monitor.	"Hévoine"	"	1863	6,007	6	4½	3,318	13	8 9½-in., 3 7½-in. guns.	"
Small floating batteries.	"Onondaga" . . .	"	"	2,592	5	4	612	6½	4 9½-in. guns.	"
"	"Arrogante" . . .	"	1861	1,511	4½	4½	131	6	1 11-in., 1 7½-in. guns.	"
"	"Embuscade" . . .	"	1865	1,580	5½	"	219	8½	"	"
"	"Implacable" . . .	"	1864	1,434	4½	"	"	"	"	"
"	"Imprenable" . . .	"	1867	1,615	5½	"	411	5½	"	"
"	"Opiniâtre"	"	1861	1,434	4½	"	457	7	2 light guns.	"
"	"Protectrice" . . .	"	1866	1,580	"	"	"	"	"	"
"	"Refuge"	"	"	1,449	"	"	"	"	"	"

2. Those with Hulls of Wood.										
Battery ship.	"Colbert"	Wood	1875	8,617	8½	7	4,652	14½	8 11-in., 1 9½-in. guns.	"
"	"Marengo"	"	1869	7,172	"	"	3,673	13½	4 11-in., 4 9½-in. guns.	"
"	"Océan"	"	1868	7,749	"	"	3,781	13½	"	"
"	"Richelieu"	"	1873	8,417	"	"	4,006	13	6 11-in., 4 9½-in. guns.	"
"	"Suffren"	"	1870	7,187	8	"	4,180	14½	4 11-in., 4 9½-in. guns.	"
"	"Tribent"	"	? 1874	8,314	8½	"	4,652	14½	8 11-in., 1 9½-in. guns.	"

Class.	Name.	Material of hull.	Date.	Displacement.	Armour.		Horse-power.	Speed.	Armament.	Remarks.
					Thick.	Thin.				
Smaller battery ship.	"Alma"	Wood	1867	tons. 3,788	in. 6	in. 4	indicated. 1,896	knots. 12	67½-in. guns.	
	"Armide"	"	"	3,765	"	"	1,585	11½	"	
	"Atalante"	"	1868	3,825	"	"	1,640	11½	"	
	"Belliqueuse"	"	1865	3,747	"	"	1,227	"	47½-in., 4 6½-in. guns.	
	"Joan of Arc"	"	1867	3,675	10	7	1,884	12½	67½-in. guns.	
	"La Gâtissomière"	"	1872	4,487	6	4½	2,370	13	69½-in. guns.	
	"Montcalm"	"	1868	3,889	"	"	1,830	11½	67½-in. guns.	
	"Reine Blanche"	"	"	3,845	"	"	1,860	11½	"	
	"Thétis"	"	1877	3,621	"	"	1,676	12	"	
	"Triomphante"	"	"	4,127	"	"	2,214	12½	69½-in., 1 7½-in. guns.	
	"Victorieuse"	"	1875	4,140	"	"	"	"	49½-in., 1 7½-in. guns.	
	"Flandre"	"	1864	5,964	"	4½	3,536	14½	89½-in., 5 7½-in. guns.	
	"Gauloise"	"	1865	5,859	"	"	3,635	13½	89½-in., 4 7½-in. guns.	
	"Guyenne"	"	1863	5,995	"	"	3,494	"	89½-in., 6 7½-in. guns.	
Broadside ship.	"Magnanime"	"	1864	5,924	"	"	3,516	13½	89½-in., 3 7½-in. guns.	
	"Provence"	"	1863	5,815	"	"	3,500	14	"	
	"Revanche"	"	1865	5,790	"	"	3,187	13½	"	
	"Savoie"	"	1864	5,876	"	"	3,050	13½	"	
	"Solferino"	"	1861	7,129	"	"	3,283	12½	109½-in., 4 7½-in. guns.	
	"Surveillante"	"	1864	7,604	"	"	3,254	13½	89½-in., 4 7½-in. guns.	
	"Valcouraise"	"	"	5,984	"	"	3,383	13½	89½-in., 1 7½-in. guns.	
	"Bélier"	"	1870	3,589	8	7	1,921	12½	29½-in. guns.	
	"Boulogne"	"	1872	3,510	"	"	1,827	"	"	
	"Cerbère"	"	1868	3,758	"	"	1,530	11½	"	
Special ship.	"Taureau"	"	1865	2,718	6	4½	1,793	12½	19½-in. gun.	
	"Tigre"	"	1871	3,601	8	7	1,880	12	29½-in. guns.	

Unarmoured Ships.

Class.	Name.	Date.	Dis- place- ment.	Horse- power.	Speed.	Guns.	Class.	Name.	Date.	Dis- place- ment.	Horse- power.	Speed.	Guns.
Cruizer ..	"Duquesne" ...	1876	tons. 5,436	indicated. 7,340	knots. 16 $\frac{3}{4}$	21	Cruizer ..	"Dayot"	1869	tons. 1,277	indicated. 917	knots. 11 $\frac{3}{4}$	6
"	"Tourville" ...	"	5,670	"	17	"	"	"D'Estrees" ...	1867	1,337	1,003	12 $\frac{1}{4}$	"
"	"Iphigénie" ...	"	3,192	"	"	14	"	"Du Chaffaut" ..	1872	1,289	1,214	12 $\frac{1}{4}$	"
"	"Duguay-Trouin" ..	1877	3,117	3,740	16	"	"	"Duclouët" ...	1869	1,277	769	11 $\frac{3}{4}$	"
"	"Naade"	"	3,284	"	"	"	"	"Eclaireur" ...	1877	1,643	1,900	15	"
"	"Champlain" ..	1872	1,931	1,953	14 $\frac{1}{4}$	10	"	"Hamelin" ...	1866	1,335	1,155	12 $\frac{1}{4}$	6
"	"Chateau-Renaud" ..	1868	1,675	1,701	"	5	"	"Hugon"	1872	1,271	915	11 $\frac{3}{4}$	"
"	"Decrès"	1866	1,616	1,478	12	10	"	"Limier"	1866	1,326	1,084	"	"
"	"Desaix"	"	1,623	1,442	14 $\frac{1}{4}$	7	"	"Linois"	1867	1,169	720	11 $\frac{1}{2}$	"
"	"d'Estaing" ...	"	2,236	"	"	15	"	"Rigault de Gen- ouilly"	"	1,627	1,900	15	8
"	"Du Petit Thou- ars,"	1877	3,189	2,018	15	10	"	"Segond"	1869	1,279	894	11 $\frac{1}{4}$	6
"	"Infernet"	1860	1,931	1,815	14 $\frac{3}{4}$	8	"	"Vaudreuil" ...	1870	1,229	867	10 $\frac{3}{4}$	"
"	"Fabert"	1874	2,060	1,107	12 $\frac{3}{4}$	"	"	"Volta"	1867	1,300	1,066	12 $\frac{1}{4}$	"
"	"Fortuit"	"	2,268	1,918	13 $\frac{3}{4}$	15	Gun vessel	"Bisson"	1874	833	792	11 $\frac{1}{4}$	4
"	"La Clochette" ..	1869	1,994	"	"	10	"	"Boursaint" ...	1872	763	679	11 $\frac{1}{2}$	3
"	"La Pérouse" ...	1872	2,236	2,500	15 $\frac{1}{2}$	15	"	"Bouret"	1876	828	817	"	4
"	"Magon"	1879	2,268	"	"	"	"	"Brat"	1867	761	557	10 $\frac{1}{4}$	"
"	"Monge"	"	2,236	"	"	"	"	"Chasseur"	1878	794	849	12 $\frac{1}{4}$	"
"	"Nielly"	"	2,236	"	"	"	"	"Dumont d'Ur- ville"	"	"	"	"	"
"	"Roland"	"	2,268	"	"	"	"	"Hirondelle" ...	1869	1,162	1,911	15 $\frac{1}{4}$	2
"	"Sané"	1870	1,976	1,967	15	3	"	"Hussard"	1875	794	849	12	4
"	"Seignelay"	1874	1,943	"	"	8	"	"La Bourdonnais" ..	1877	842	505	10 $\frac{1}{4}$	"
"	"Villars"	1879	2,268	2,500	15 $\frac{1}{2}$	15	"	"Lancier"	1878	794	7849	12	"
"	"Beaumonts- Beaupré,"	1872	1,255	"	"	"	"	"Parseval"	"	750	"	"	"
"	"Bourayne"	1869	1,292	"	"	"	"	"Voltigeur"	1878	794	7840	12	"

There are also 12 smaller gun-vessels of the modern type, besides store ships, troop ships, and gunboats. No vessel launched before 1867 has been counted, though a large number of older craft are still on the effective list of the French Navy and some are actually in Commission.

Wooden Armour-clads.

Class.	Name.	Material of hull.	Date.	Armour.		Dis- place- ment.	Horse- power.	Speed.	Armament.	Remarks.
				Thick.	Thin.					
Battery ship. Turret do.	"Hansa"	Wood	1872	7	4	tons. 3,611	indicated. 3,000	knots. 12	8 8-in. guns.	
	"Arminius" ...	"	1864	4½	3½	1,583	1,200	10½	4 8-in. guns.	

(The armoured vessel "Prinz Adalbert" seems to have been struck off the list.)

Unarmoured Ships.

Class.	Name.	Date.	Dis- place- ment.	Horse- power.	Speed.	Guns	Class.	Name.	Date.	Dis- place- ment.	Horse- power.	Speed.	Guns
Cruizer ..	"Leipzig"	1875	tons. 3,925	indicated. 4,800	knots. 16	12	Cruizer..	"F"	Bldg.	tons. 2,856	indicated. 2,500	knots. 15	16
"	"Pr. Adalbert" * ..	1876	"	"	"	"	"	New "Vineta" ..	"	"	"	"	"
"	"Bismarck"	1877	2,856	2,500	15	16	"	New "Augusta" ..	"	"	"	"	"
"	"Blucher"	"	"	"	"	"	"	"Freya"	1874	1,385	2,400	14½	8
"	"Stosch"	1878	"	"	"	"	"	"Luise"	1871	1,692	2,100	14	"
"	"Moltke"	1879	"	"	"	"	"	"Ariadne"	1872	"	"	13	"
"	"Gneisenau"	"	"	"	"	"	"	"Albatross"	1871	705	600	10½	4
"	"Stein"	Bldg.	"	"	"	"	"	"Nautilus"	"	"	"	"	"
"	"E"	"	"	"	"	"	"	"Habicht"	1879	848	"	"	Bld.
"	"	"	"	"	"	"	"	"Moewe"	"	"	"	"	"

There are 7 small gun-vessels of the newer type, and 3 corvettes of the older type, besides 2 torpedo-vessels, yachts, despatch-boats, &c., on the list of effectives.

* Formerly "Sedan."

GREECE.

Armoured Ships.

Class.	Name.	Material of hull.	Date.	Displacement.	Armour.		Horse-power.	Speed.	Armament.	Remarks.
					Thick.	Thin.				
Battery ship.	"Adml. Miaulis"	Iron	1879	tons, 1,800	in. ..	in. ..	indicated, 2,100	knots, 15½	4 6½-in. Krupp guns.	
"	"Olga"	"	"	2,060	5	..	350 nom.	10	2 9-in. Arm., 2 10 8-in.	
"	"King George"	"	1869	1,774	8	6	2,400	?14½	2 9-in. Armstrong guns.	2 screws.

There is 1 cruiser of the newer type, viz., the "Themistocles." On the list are 1 old-fashioned corvette, 6 gun-vessels, and about the same number of yachts and small craft.

HOLLAND.
Armoured Ships.

Class.	Name.	Mate- rial of hull.	Date place- ment.	Armour.		Dis- place- ment.	Horse- power.	Speed.	Armament.	Remarks.
				Thick.	Thin.					
Turret ship.	"King of the Netherlands"	Iron	1874	12	6	5,285	indicated. 4,630	knots. 11½	4 11-in. Armstrong guns...	2 turrets.
	"Prince Henry"	"	1867	5½	4½	5,400	2,392	12	4 9-in. Armstrong guns ..	"
	"Stier"	"	1868	8	6	2,113	2,238	12½	2 9-in. Armstrong guns ..	1 turret.
	"Schorpioen"	"	"	"	"	"	"	"	"	"
	"Buffel"	"	"	8½	6½	2,190	2,200	"	"	"
Monitor.	"Guinea"	"	"	"	"	"	"	"	"	"
	"Drak"	"	1877	8	6	2,156	800	7	2 11-in. Krupp guns.	"
	"Matador"	"	1878	4½	..	1,650	650	8	"	"
	"Lupaard"	"	1876	1,525	3½	1,525	680	9	1 11-in. Krupp gun.	"
	"Hyena"	"	1870	1,400	"	1,400	650	"	2 9-in. Armstrong guns.	"
	"Panter"	"	"	"	"	"	"	"	"	"
	"Haai"	"	1871	"	"	"	"	7½	"	"
	"Wesp"	"	"	"	"	"	"	8	"	"
	"Alder"	"	"	"	"	1,566	"	7½	"	"
	"Krokodil"	"	1868	5½	3½	1,530	700	9	"	"
	"Heiliglee"	"	"	"	"	"	"	"	"	"
	"Tijger"	"	"	"	"	1,414	"	9½	"	"
	"Cerberus"	"	1869	"	"	1,600	"	8	"	"
	"Bloodhound"	"	"	"	"	"	"	?	"	"
Armoured gunboat.	"No. 1"	"	1863	500	4½	500	450	9	2 60-pounder S. B. guns.	"
River gunboat.	"Valuis"	"	1870	367	"	367	200	8	2 light Krupp guns.	"
"	"Isala"	"	1876	"	5	"	320	"	"	"
"	"Rhenus"	"	1877	"	"	"	"	"	"	"
"	"Mosa"	"	1878	"	"	"	"	"	"	"
"	"Merva"	"	1876	"	"	"	"	"	"	"

Unarmoured Ships.

(The Dutch still keep up a separate Indian Navy.)

Class.	Name.	Date.	Dis- place- ment.	Horse- power.	Speed.	Guns.	Class.	Name.	Date.	Dis- place- ment.	Horse- power.	Speed.	Guns.
Cruizer...	"Atjeh".....	1876	3,268	indicated.	knots.	10	Cruizer..	"Samarang" (Indian Navy)	1876	850	350	..	3
"	"Tromp".....	1877	"	2,269	"	"	"	"Batavia".....	"	"	"	"	"
"	"De Ruyter"....	1879	"	"	"	"	"	"Macassar"....	"	"	"	"	"
"	"Queen Emma" ..	1869	3,300	3,300	15	"	"	"Padang".....	1878	"	"	"	"
"	"Zilveren Kruis" ..	1872	"	1,100	"	12	"	"Riouw".....	1872	730	340	"	"
"	"Van Galen" ..	1867	2,160	700	"	"	"	"Banda".....	"	"	"	"	"
"	"Marnix".....	1867	1,490	21,100	"	6	"	"Amboyna".....	1873	"	"	"	"
"	"Alkmaar".....	1874	1,010	690	"	3	"	"Deli".....	"	"	"	"	"
"	"Aruba".....	1873	730	350	"	"	"	"Sambas".....	1874	750	350	"	"
"	"Surinam".....	1877	850	"	"	4	"	"Pontiauck"....	1873	"	"	"	"
"	"Bonaire".....	"	"	"	"	"	"	"Bandjermasing" ..	1874	"	"	"	"
"	"St. Eustatius" ..	1876	"	"	"	"	"	"Palembang" ..	"	"	"	"	"

On the lists of both the Home and the Indian Navy there is a large number of older-fashioned and smaller vessels than the above.

ITALY.

*Armoured Ships.**a. Iron Hulled Ships.*

Class.	Name.	Material of hull.	Date.	Displacement.	Armour.		Horse-power.	Speed.	Armament.	Remarks.
					Thick.	Thin.				
Turr. ship.	"Dulio"	Iron	1876	10,570	22	12½	indicated.	knots.	4 100-ton Armstrong guns	Steel armour on turrets.
"	"Dandolo"	"	1878	10,650	"	"	7,500	14	"	"
Barb. ship	"Italia"	"	"	13,700	35	16	9,000	16	"	Building.
"	"Lepanto"	"	"	"	"	"	"	"	"	"
Sm. turret ship.	"Affondatore" ..	"	1865	4,070	5	3½	3,200	13	2 8-in. Armstrong guns.	"
Batt. ship.	"Ancona"	"	1863	4,250	"	"	3,000	11½	11 8-in. Armstrong guns.	"
"	"Castelfidardo" ..	"	"	"	"	"	"	"	"	"
"	"Maria Pia"	"	1864	"	"	"	"	"	"	"
"	"San Martino" ..	"	"	"	"	"	1,800	12	8 8-in. Armstrong guns.	"
"	"Terribile"	"	1862	2,700	4½	"	"	"	"	"
"	"Formidabile" ..	"	"	"	"	"	"	"	"	"
"	"Varese"	"	"	2,000	"	"	1,000	9	4 8-in. Armstrong guns.	"

b. Wooden Hulled Ships.

Class.	Name.	Material of hull.	Date.	Displacement.	Armour.		Horse-power.	Speed.	Armament.	Remarks.
					Thick.	Thin.				
Batt. ship.	"Palestro"	Wood	1872	5,780	8	6	indicated.	knots.	1 11-in., 4 10-in. Arm.	
"	"Prince Amadeo" ..	"	1873	"	"	"	3,200	12½	"	
"	"Venezia"	"	1871	5,700	6	4	3,500	13	11 10-in. Armstrong guns.	
"	"Roma"	"	1869	"	"	"	3,500	"	"	
"	"Conte Verde" ..	"	1861	3,930	4½	3½	2,000	8	6 9-in., 1 8-in. Arm. guns.	

Unarmoured Ships.

Class.	Name.	Date.	Dis- place- ment.	Horse- power.	Speed.	Guns	Class.	Name.	Date.	Dis- place- ment.	Horse- power.	Speed.	Guns
Cruizer ..	"Garibaldi" ....	..	3,440	indicated.	knots.	8	Cruizer..	"Rapido" ..	1877	tons.	indicated.	knots.	5
"	"Cristoforo Co-	1876	2,290	3,782	16½	5	"	"Vettor Pisani"	..	1,450	1,810	12½	14
"	"Iombo."	1877	1,705	2,140	15½	"	"	"Carnaciolo" ...	..	1,580	300 nom.	..	6
	"Staffetta"												

There are 3 steam torpedo-vessels, and 2 gun-vessels of the newer type under 700 tons, besides older-fashioned craft, transports, gunboats, &c., on the Italian list.

JAPAN.

Armoured Ships.

Class.	Name.	Mate- rial of hull.	Date.	Dis- place- ment.	Armour.		Horse- power.	Speed.	Armament.	Remarks.
					Thick.	Thin.				
Battery ship	"Foo-Soo"	Iron	1877	3,700	in.	in.	indicated.	knots.	415½-ton, 2 5½-ton Krupps	
Belled cruiser. .	"Kon-go"	"	"	2,800	9	7	3,500	13	12 7-in. Krupp guns.	
Broadside ship ..	"Hi-jet"	"	1878	"	4½	..	2,500	13½	"	
Battery ship	"Rio-ji-Kan" ..	Wood	..	1,459	..	..	250 nom.	..	10 6-in. Krupp guns.	
	"Adsuma-Kan"	"	?1865	?700	?6	?3½	1,300	9	1 9-in., 2 70-pr. Armstrongs	

Unarmoured Ships.

Class.	Name.	Date.	Dis- place- ment.	Horse- power.	Speed.	Gun.	Class.	Name.	Date.	Dis- place- ment.	Horse- power.	Speed.	Gun.
Cruizer .. "	"Ten-rio" "Kaimon"	Bldg. " "	tons. 1,490 "	1,250 "	knots. .. "	7 8	Gun vessel	"Iwaki"	Bldg.	tons. 600	650	knots. ..	3

The remaining unarmoured vessels are small, and some are old.

PERU.

Armoured Ships.

Class.	Name.	Mate- rial of hull.	Date.	Dis- place- ment.	Armour.		Horse- power.	Speed.	Armament.	Remarks.
					Thick.	Thin.				
Monitor .. "	"Manco Capac" "Atahualpa" ..	Iron "	1864 "	tons. 1,034 "	in. 5 "	in.	330 nom. " "	knots.	? 2 9-in. Whitworth guns. ? 2 15-in. S.B. guns.	

There are, on the Peruvian list, 2 old-pattern frigates, 2 corvettes, and 8 smaller steamers.

N.B.—One of the monitors is reported (June, 1880) to have been destroyed.

PORTUGAL.

Armoured Ship.

Class.	Name.	Material of hull.	Date.	Dis- place- ment.	Armour.		Horse- power.	Speed.	Armament.	Remarks.
					Thick.	Thin.				
Battery ship..	"Vasco de Gama".	Iron	1876	tons. 2,479	in. 9	in. ..	indicated. 3,625	knots. 13½	2 11-in. Krupps, 4 lighter guns.	

Unarmoured Ships.

Class.	Name.	Date.	Dis- place- ment.	Horse- power.	Speed.	Guns.	Class.	Name.	Date.	Dis- place- ment.	Horse- power.	Speed.	Guns.
Cruizer..	"Queen of Por- tugal."	1876	tons. 1,023	150 nom. 900 ind.	knots. ..	8	Cruizer..	"Mindello"	1876	tons. 1,020	150 nom. 900 ind.	knots. ..	8

There are 8 of the newer type of gun-vessel, 2 transports, and some small steamers besides, on the list of the Portuguese Navy, in addition to 6 corvettes of the older kind.

RUSSIA.

Armoured Ships.

Class.	Name.	Material of hull.	Date.	Displacement.	Armour.		Horse-power.	Speed.	Armament.	Remarks.
					Thick.	Thin.				
Turret ship . . . ?	"Peter the Great"	Iron .	1872	9,506	in. 14	in. 10	8,700	knots. 14	4 12-in. 40-ton guns.	Formerly a turret ship.
	"Minin"	"	1878	5,650	8	6	5,600	"	4 8-in. guns; 8 lighter.	
Battery ship . . Belted cruiser. "	"Prince Poyarski"	"	1867	4,291	4½	3½	2,835	10½	10 8-in. guns.	
	"Gen. Admiral"	"	1873	4,438	6	4	6,300	13	4 8-in. guns.	
	"Duke of Edinburgh."	"	1875	4,610	"	"	"	"	"	
(The above may be distinguished as sea-going ships.)										
Broadside ship "	"Pervenetz"	"	1863	3,225	4½	3½	800	9	14 8-in. guns.	3 turrets. " 2 turrets.
	"Neron-Menja"	"	1864	3,260	"	"	1,140	8	16 8-in. guns.	
Turret vessel . "	"Kreml"	"	1867	3,358	"	"	913	8½	12 8-in. guns.	
	"Adm. Lazareff"	"	1867	3,450	15	3	2,020	10½	6 9-in. guns.	
	"Adm. Greig" . . .	"	1868	3,841	"	"	"	"	3 11-in. guns.	
Circular ship . .	"Adm. Tchitchelagoff."	"	"	3,396	16	4	2,030	10½	2 11-in. guns.	2 turrets.
	"Adm. Spiridoff"	"	1875	3,550	p 10	p 16	"	8½	2 12-in. guns.	
	"Vice-Admiral Popoff."	"	"	"	"	"	"	"	"	
Monitor	"Novgorod"	"	1873	2,491	11	9	"	6½	2 11-in. guns.	2 turrets. " " 1 turret. " " "
	"Czarodeika" . . .	"	1867	1,820	4½	3½	750	8½	4 9-in. guns.	
	"Russalka"	"	1864	1,438	"	"	700	8½	2 9-in. guns.	
	"Smertch"	"	"	1,454	p 11	5	443	6½	"	
	"Streletz"	"	"	"	"	"	460	"	"	
	"Jednorog"	"	"	1,663	"	"	490	6½	"	
"	"Latnik"	"	"	1,548	"	"	481	7½	"	"
	"Brononosetz" . .	"	"	1,437	"	"	453	7½	"	"
"	"Uragaw"	"	"	"	"	"	"	"	"	"

Class.	Name.	Mate- rial of hull.	Date.	Dis- place- ment.	Armour.		Horse- power.	Speed.	Armament.	Remarks.
					Thick.	Thin.				
Monitor.	"Tifon"	Iron	1864	tons. 1,427	in. ? 11	in. ..	443	knots. 6 $\frac{3}{4}$	2 9-in. guns.	1 turret.
"	"Lava"	"	"	1,514	"	"	335	6	"	"
"	"Perun"	"	"	1,573	"	"	338	5 $\frac{3}{4}$	"	"
"	"Yetschoun"	"	"	"	"	"	529	7 $\frac{1}{4}$	"	"
"	"Koldun"	"	"	1,441	"	"	481	7 $\frac{3}{4}$	"	"
Broadside ship	"Sevastopol"	Wood	1863	3,098	4 $\frac{1}{2}$	3	6,088	12	18 8-in. guns.	"
"	"Petropaulsk"	"	"	5,944	"	"	2,088	11	22 8-in. guns.	"

Unarmoured Ships.

Class.	Name.	Date.	Dis- place- ment.	Horse- power.	Speed.	Guns.	Class.	Name.	Date.	Dis- place- ment.	Horse- power.	Speed.	Guns.
Cruizer ..	"Rasboynik" ..	1877	tons. 1,335	indicated. 1,700	knots. 13 $\frac{1}{2}$	3	Purchased cruizer.	"Asia" .....	..	tons. ?3,000			
"	"Najezdnic" ..	1878	"	"	"	"	"	"Jaroslav"	bldg.	?	3,000 ind.	15 $\frac{1}{2}$	
"	"Kreuzer"	1875	"	1,500	"	"	"	"Afrika" .....	..	"		
"	"Dzigit"	"	"	"	"	"	"	"Nischnei Novgo- rod	..	"			
"	"Plastun"	1878	"	"	"	"	"	"Constantine" ..	..	1,600	350 nom.		4
"	"Strelak"	1879	"	1,030	15	7	"	"Vladimir" .....	..	1,652	400		7
"	"Zabiyaka"	1878	1,200	800 nom.	..	"	"	"Vesta" .....	..	1,800	350		12
Purchased cruizer.	"Kossia" .....	..	3,098	"	..	"	"	"Argonaut" .....	..	715	250		6
"	"Moskwa" .....	..	3,000	"	..	"	"						
"	"Petersburg" ..	..	?	"	..	"	"					
"	"Europa" .....	..	"	"	..	"	"					

There is a large number of old-fashioned frigates, corvettes, and gun-vessels, besides small steamers, on the Russian list.

SPAIN.

Armoured Ships.

Class.	Name.	Material of hull.	Date.	Displacement.	Armour.		Horse-power.	Speed.	Armament.	Remarks.
					Thick.	Thin.				
Broadside ship	"Victoria"	Iron	1867	7,100	5½	in. 4	1,000 nom.	knots. 12½	4 9-in., 38-in., 12 7-in. Arm.	
"	"Numancia"	"	1863	7,050	5	4½	"	12½	6 10-in., 38-in., 16 7-in. Arm.	
"	"Sagunto"	Wood	1867	6,300	6	4	"	12½	10 8-in., 37-in. guns.	
"	"Zaragoza"	"	1867	5,400	4½	3½	800 nom.	11	6 9-in., 37-in. guns.	
Battery ship..	"Mendez Nunez" ..	"	1861	3,250	4½	"	500 nom.	7½	4 9-in. guns.	
River monitor	"Fuiguerdia"	Iron	1875	524	4	2½	328 ind.	8½	3 guns (light).	
Small battery.	"Duke of Tetuan"	?	"	600	"	3½	80 nom.	6	4 guns (ditto).	? Building.

One armour-clad, the "Arapiles," appears to have been removed from the list.

Unarmoured Ships.

Three ships, the "Castilla," "Argon," and "Navarra," are given as armour-clads being converted into cruisers.

Class.	Name.	Date.	Displacement.	Horse-power.	Speed.	Guns.	Class.	Name.	Date.	Displacement.	Horse-power.	Speed.	Guns.
Cruiser ..	"Maria de Mo- lina"	1877	tons. ..	380 nom.	knots. ..	10	Purchased cruiser	"Tornado"	1869	tons. ..	300 nom.	knots. ..	3
"	"Jorge Juan" ..	1876	920	1,106 ind.	13½	3	"	"Bazan"	1873	..	115 "	..	2
"	"Sanchez Bar- caisdegue"	"	"	1,072	13½	3	"						

Besides the old-fashioned frigates, corvettes, &c., on its list, the Spanish Navy contains several gun-vessels and gunboats of recent construction.

SWEDEN AND NORWAY.

SWEDEN.

Armoured Ships.

Class.	Name.	Material of hull.	Date.	Displacement.	Armour.		Horse-power.	Speed.	Armament.	Remarks.
					Thick.	Thin.				
Monitor	"John Ericsson"	Iron	..	Tons. 1,500	in. 11	in. 5½	380	knots. 7	2 15-in. S. B. guns.	The armament of the Swedish Navy appears to be in course of being changed.
"	"Thordön,"	"	..	"	"	"	"	7½	2 9½-in. rifled guns.	
"	"Tyrifing"	"	..	1,518	"	"	"	"	"	
"	"Løke"	"	..	1,600	18	"	430	8	"	
Armoured gunboat	"Garner"	"	1865	260	6	"	90	5½	1 9-in. gun.	
"	"Feuris"	"	..	"	11	1½	43	6	1 8-in. gun.	
"	"Sköld"	"	..	240	8	"	..	3½	"	The armament of the Swedish Navy appears to be in course of being changed.
"	"Gerta"	"	..	460	12½	2½	133	8	2 8-in. guns.	
"	"Hildur"	"	..	"	"	"	"	"	1 8-in. gun.	
"	"Björn"	"	?1866	"	"	"	155	"	"	
"	"Bersek"	"	"	"	"	"	"	"	"	
"	"Falko"	"	"	"	"	"	"	"	"	
"	"Sölve"	"	"	"	"	"	"	"	"	The armament of the Swedish Navy appears to be in course of being changed.
"	"Ulf"	"	1873	"	"	"	"	"	"	
"	(not named)	"	"	"	"	"	"	"	"	
"	(not named),...	"	..	"	"	"	"	"	"	

Unarmoured Vessels.

There are, besides the old-fashioned craft, 8 unarmoured Swedish vessels of the newer type, but all are of a size smaller than ocean cruisers.

NORWAY.

Armoured Ships.

Class.	Name.	Material of hull.	Date.	Displacement.	Armour.		Horse-power.	Speed.	Armament.	Remarks.
					Thick.	Thin.				
Monitor.	"Mjölnir"	Iron.	1866	Tons. 1,541	in. 12	in. 2½	indicated.	knots. 8½	2 8½-inch guns.	
"	"Scorpionen"	"	"	1,447	"	4½	444	8	2 11-inch guns.	
"	"Thrudvang"	"	"	1,515	"	"	500	8½		
"	"Thor"	"	"	2,003	13½	7	600	9	2 11-inch guns.	

Unarmoured Ships.

The 5 unarmoured vessels of the newer type, in the Norwegian Navy, are of a less size than that of ocean cruisers.

TURKEY.

Armoured Ships.

Class.	Name.	Material of hull.	Date.	Displacement.	Armour.		Horse-power.	Speed.	Armament.	Remarks.
					Thick.	Thin.				
Broadside ship.	"Azizié"	Iron.	1864	Tons. 6,400	in. 4½	in. 3½	indicated.	knots. 12	1 9-in. ; 14 7-in. Armstrongs.	
"	"Orhanié"	"	"	"	"	"	"	"	"	
"	"Mehmoudié"	"	"	"	"	"	"	"	"	
"	"Osmanié"	"	"	"	"	"	3,000	"	"	

Class.	Name.	Mate- rial of hull.	Date.	Dis- place- ment.	Armour.		Horse- power.	Speed.	Armament.	Remarks.
					Thick.	Thin.				
Batt. ship	"Messoudié"	Iron	1875	9,140	in. 12	in. 7½	indicated. 7,910	knots. 13½	12 10-in.; 3 7-in. Armstrongs.	
"	"Nassratjé"	"	1876	"	" 8	" 5	6,800	13½	"	
"	"Assur-i-Fewik"	"	1868	5,687	" 8	" 5	3,100	13½	6 9-in.; 2 8-in. guns.	
"	"Fete-i-Bulend"	"	1869	2,760	9	4	1,800	13½	4 9-in. Armstrong guns.	
"	"Mukadem-Haii"	"	1872	"	"	"	"	12½	"	
"	"Idjilalich"	"	1870	2,228	7	"	1,650	11	"	
"	"Acher-Sheket"	"	1869	2,046	"	3½	"	11½	1 9-in.; 5 7-in. guns.	
"	"Nedjimi-Sheket"	"	1868	"	" 6	" 4½	1,500	"	"	
"	"Arni-Ilalh"	"	"	2,380	" 6	" 4½	1,500	12½	4 9-in. Armstrong guns.	
"	"Muit-Zaffeh"	"	"	"	" 5½	" 3½	200 nom.	"	2 9-in.; 2 7-in. guns.	
Turr. ship	"Hufz-i-Rahmar"	"	"	2,500	5½	3½	404	12	"	
Monitor.	"Hozber"	"	1875	652	3½	3½	290	7	2 light guns.	
River bat- teries.	"Feth-i-Islam"	"	1864	511	" 2½	" 2½	"	8	"	
	"Buyurt-len"	"	"	"	"	"	"	"	"	
	"Semderé"	"	"	"	"	"	"	"	"	

The armour-clads of the Egyptian Navy were turned over to Turkey before the late war, and are included under their new names in the foregoing list.

Unarmoured Ships.

Neither Turkey nor Egypt have any cruising fighting ships of the new type.

UNITED STATES.

Armoured Ships.

Class.	Name.	Material of hull.	Date.	Armour.		Displacement.	Horse-power.	Speed.	Armament.	Remarks.
				Thick.	Thin.					
Monitor	"Miantonomoh"	Iron.	..	in. 12	in. ..	Tons. 4,570	indicated. 2,500	knots. ? 14	2 15-in. S.B. ; 2 rifled guns.	Rebuilding.
"	"Monadnock"	"	..	7½	..	5,000	1,625	8	"	"
"	"Ajax"	"	1864	7	5	550	nominal. 400	6½	2 15-in. S.B. guns.	
"	"Cononius"	"	1865	"	"	"	"	8	"	
"	"Mahopac"	"	"	"	"	"	"	"	"	
"	"Manhattan"	"	"	"	"	"	"	"	"	
"	"Sangus"	"	1864	"	"	"	"	"	"	
"	"Wyandotte"	"	1865	"	"	"	"	"	"	
"	"Camanche"	"	1863	4½	"	496	"	"	1 15-in. S.B. ; 1 11-in. S.B.	
"	"Catskill"	"	"	"	"	"	200	..	"	
"	"Jason"	"	1864	"	"	"	"	..	"	
"	"Legh"	"	"	"	"	"	"	..	"	
"	"Montank"	"	"	"	"	"	"	..	"	
"	"Nahant"	"	"	"	"	"	"	..	"	
"	"Puritan"	"	1863	"	"	"	"	..	"	
"	"Wood"	Wood	..	8	6	1,870	4,500 ind.	12	2 20-in. S.B. guns.	
"	"Dictator"	"	1862	"	"	1,750	"	"	4 15-in. S.B. guns.	
"	"Terror"	"	1865	"	"	1,085	800 nom.	7	"	Rebuilding.
"	"Amphitrite"	"	..	"	"	874	600 nom.	"	"	

There are 6 other Monitors, which are apparently only considered suitable for harbour service.

Unarmoured Ships.

Class.	Name.	Date.	Dis- place- ment.	Horse- power.	Speed.	Guns.	Class.	Name.	Date.	Dis- place- ment.	Horse- power.	Speed.	Guns.
Cruizer ..	"Trenton"	1876	tons. 3,800	indicated.	knots. 13	11	Cruizer..	"Quinnebaug" ..	1877	tons. 1,840	..	..	11
"	"Vandalia"	?	2,080	1,176	12	8	"	"Marion" .....	?	"	..	..	8
							"	"Nipsic"	1878	1,375	..	..	6

There are 42 unarmoured ships on the effective list of the United States' Navy; the majority, if not the whole of these, are not of the newer type. The "Quinnebaug" and "Marion" have 6 sisters; the former was *rebuilt* and completed in 1877. The others are, perhaps, correctly considered as being of the older type, when compared with the recent additions to European Navies.

NEWER TYPE BELONGING TO DIFFERENT FOREIGN NAVIES. 609

The following summarizes the lists printed on the foregoing pages. With respect to unarmoured ships of the newer type, the larger gun-vessels are included; gunboats and smaller gun-vessels are not. The totals include ships of various degrees of efficiency :—

Countries.	Armour-clads.		Unarmoured ships.	Remarks.
	Iron.	Wood.		
Argentine Republic	3			
Austria	6	5	12	Small river monitors omitted.
Brazil	11	2	3	" "
Chili	3			
China .....	..	..	? 18	One armoured river gunboat omitted.
Denmark.....	6	1	2	
France.....	25	32	51	Omitting small armoured river batteries.
Germany....	22	2	17	The new armoured gunboats are included.
Greece.....	3	..	1	
Holland	19	..	24	Omitting armoured river gunboats.
Italy	12	5	6	
Japan	3	2	3	
Peru	2			
Portugal....	1	..	2	
Russia.....	27	2	18	Including purchased cruisers.
Spain	3	3	? 5	Armour-clads, being unarmoured, not included.
Sweden	4	..	8	Omitting armoured gunboats.
Norway	4	..	5	
Turkey	13	..	..	Omitting armour river batteries.
United States	14	4	?	

The armament of the iron and wooden hulled armour-clads of the above nations, if complete, would comprise the following guns of 7-inch calibre and upwards :—

Countries.	Guns.	Remarks.
Argentine Republic	4	Not including the ship building.
Austria	106	
Brazil	28	Not including river monitors.
Chili	14	
Denmark.....	35	
France.....	353	
Germany.....	135	
Greece.....	18	
Holland	41	
Italy.....	121	
Japan	39	
Peru.....	4	
Portugal	2	
Russia.....	155	Including some heavy S.Bs.
Spain	70	
Sweden.....	20	
Norway	8	
Turkey.....	134	
United States	44	Chiefly, if not entirely, S.Bs.

NOTICES OF BOOKS.

Géographie Militaire. Vol. I, France, 1879. Vol. II, Grandes Alpes Suisse et Italie, 1880. Paris : Dumaine. Each vol. about $7\frac{1}{2}'' \times 4\frac{3}{4}'' \times 1''$. Weight 17 and 13 ozs. ; price 5 and 4 francs respectively.

"Depuis quelque temps les études géographiques ont repris faveur en France. A cette œuvre commune je viens apporter ma modeste part d'efforts."

SUCH is the opening sentence of two volumes of a work entitled "Géographie Militaire," which have lately been published by Dumaine, of the Rue et Passage Dauphine, 30, in Paris, the two volumes being assigned respectively to France and to the Grandes Alpes, Switzerland and Italy. Has the sentence which heads this preface any analogy to the state of feeling in England?

Is the study of geography, whether general or military, in favour with the British public? with the Officers of the British Army? With the latter, military, perhaps yes, if marks are to be gained by it in some competitive examination : general, as a subject of study, we fear not.

And yet there are few studies which ought to be so attractive to the British soldier ; with the exception of our neighbours the Dutch, we belong to the only Army which passes the greater part of its service away from home. One might suppose that the very diversified nature of our service would suffice to induce a love for this subject.

The first volume of the work now under notice commences with a geological description of France, of the plateaus which present features of elevation, and of the corresponding, or rather consequent, basins, illustrated by sketch maps.

This introduction is succeeded by a purely geographical description of France and of the neighbouring countries. France is here tersely described as an irregular hexagon, of which the major axis is represented by a line from Dunkirk through Paris to Perpignan. The work then proceeds to treat of the fronts of the hexagon under the designation of—

The north or Belgian front, which includes Picardy and Normandy ; the north-east or German front, Lorraine and Champagne ; the Jura or Swiss front, Franche Comté and Burgundy ; the Alpine or Italian front, Provence and Dauphiny ; the maritime front, Brittany and La Vendée ; the front of the Pyrenees, Gascony and Aquitaine. These fronts are severally considered in the order above indicated, with the exception of the transposition of the two last, and the volume concludes with a description of the central region or plateau.

Volume the second commences with the announcement that the volume comprising the geography of France having been published in October, 1878, and succeeded by that of 1879, a similar annual volume may be expected, comprising a series of geographical monographs.

To the second volume are added two maps ; one of the Alps and Northern Italy, the other of the Italian Peninsula. The arrangement is much the same as in the former volume ; but, inasmuch as that treated only of France, this plainly indicates the universality of the series which is to follow.

Each zone or frontier is treated under its various aspects, orographically, hydrographically, strategically, and with a historical summary of the various military operations of which it has been the sphere.

The work is plainly and even pleasantly written, and may be safely recommended as an addition to the military library.—B. W.

L'Année Maritime. Troisième Année, 1878. Paris : Challamel Ainé, 5, Rue Jacob. 1879. Price 3 francs 50 cents.

THIS useful and instructive annual has now appeared three years in succession. Former numbers of it have been noticed in the Journal, and it is only necessary to say at the present time that it fully keeps up the character then given it. It would, however, have even more value than it has, as a book of reference for naval Officers desirous of learning what is going on in the naval world at large, were it brought more nearly up to date. The present volume, for 1879, was not to be got in England till a few months ago, and it only contains information in reality up to the close of 1878. If it could be made to contain facts concerning the navies of the world up to the end of the year preceding that in which it actually appears, it would be difficult to praise it too highly.—B.

The R. B. Forbes' Rigs for Fore-and-Aft Vessels, Steamers, Ships, Barks, Yachts, and Boats. New York : The Nautical Gazette Press. 1880. 4to pamphlet, 12 pp.

THIS is a republication of papers by Captain R. B. Forbes, who is, we believe, a merchant service Officer of great experience, explaining his proposals for altering the rigs of large vessels, fore-and-aft schooners, and boats. Recognising the difficulties of reconciling the present requirements of the engine department, especially as regards the funnels, with the arrangement of the spars and sails in rigged steamers, the author has set himself to devise plans by which to meet them. This, rather than his suggested fore-and-aft rig or his rigs for boats, will interest naval Officers. A glance at our new cruiser "Iris," as at present rigged, will show how many obstacles there are in the way of giving such craft sufficient sail-power. We recommend Captain Forbes' rigs "No. 2" and "No. 3" to those who care to look into this really important matter. His proposals appear to be highly ingenious and well deserving of examination.

